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OLD AGE

OLD AGE

OLD AGE

ITS COMPENSATIONS AND REWARDS

BY

A. L. VISCHER

DR. MED.

FOREWORD BY
LORD AMULREE
M.D., F.R.C.P.

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FOREWORD

by Lord Amulree, M.D., F.R.C.P.

THE name of Dr. A. L. Vischer has been known in England for his work on the mentality of prisoners of war. From this has developed his twenty years of work for the old people of Basle, which have earned him a place of honour in the estimation of those interested in this subject and have ensured that any words he may write will be given full and earnest consideration. He brings to this matter a freshness, a profound knowledge and a ripe wisdom of which those who have visited him at Basle are deeply conscious.

The Cantons of Switzerland have for many years provided homes, in the form of single, unfurnished rooms for those elderly citizens who can afford to pay upwards of ten francs a day; this is equivalent, to-day, to about £200 a year in English money. In Basle, two or three large houses, adjoining the Hospital, have been purchased by the Canton and furnished as homes for these elderly citizens of Basle who cannot, either because of poverty or age, maintain themselves in their own homes. The rooms in these houses have been opened as dormitories, each containing two or three beds, where the old folk live, surrounded by such of their small personal belongings as they care to bring with them. Communal meals are provided in one of the former wards of the old hospital, and are well chosen, well cooked and substantial: any inmate can receive a daily ration of wine. Dr. Vischer, backed by enlightened and co-operative authorities, has seen that the link between these homes and the hospital is strong, and that there is no difficulty, either medical or administrative, in arranging for the prompt admission of any old person in need of hospital treatment, whether short or long. Dr. Vischer and his assistants look after the old people and are also in charge of the so-called chronic sick, who are accommodated in the small wards of the old hospital which stands within the same curtilage as the magnificent, new acute hospital which has just been com-

Old Age

pleted. Hence, to their great advantage, both the old people and the chronic, or long term sick, are embraced by the same organization as the acute, or short term, sick.

The old people in the homes are not subject to a number of tiresome rules and regulations, but are allowed a considerable degree of freedom, even to the extent of spending long holidays with friends or relations. It is also part of Dr. Vischer's wise policy to give to all of them an opportunity to work in the hospital—for the men employment is available as porters, lift-men, cleaners, etc., while the women help in mending, making dressings and bandages, cleaning and in the laundry. No one is compelled to work in this way, but Dr. Vischer has found that, after a month or six weeks' stay in the homes, about ninety per cent of the old people ask if they cannot be given some job: if they are not strong enough to work for a whole day, there is no objection to their working for as long a time as they feel able, no matter how short this may be. For this work the old people are paid a regular small wage, which they keep as pocket money. Certainly the effect of this treatment is startling; there is none of the atmosphere of hopelessness and gloom so often associated with Public Assistance Institutions in England. Their morale is high, they feel that they are keeping their place as active and respected members of the community which they know, and this goes far towards mitigating any distress which they may have felt on giving up their own home. At the same time the hospital benefits by being freed, to a certain extent, from the constant anxiety of obtaining domestic staff.

The homes for those who can pay up to £200 a year come under the same wise administration. Several small houses, again adjoining the hospital, have been purchased, each of which houses ten or a dozen people. Each inmate has a single room, which he can furnish with his own furniture and belongings. Meals are taken, at small tables, in a common dining room, and a small staff is employed for cooking and cleaning. Again, there are no rules or galling regula-

Foreword

tions, and all the facilities of the hospital are available if required.

During the past few years there has been, in this country, a slow awakening of interest in the care of the aged. Several causes have contributed to this, of which the greatest probably has been the realization that the social class to which the old people who are in need of some institutional care belong is growing increasingly wide. There are good reasons for this—lack of domestic help, increased taxation, shortage of houses and an inability to cope with the increasing difficulties and perplexities of modern life. Against the perfectly true statement that, until their death, over ninety per cent of old people live either in their own or in their relatives' homes, there is also the fact that when any new home for old people opens it is immediately confronted with a long, and increasing, waiting list. As an example of this I would quote the experience of a series of small homes, totalling in all about 140 beds, which was opened in North London during the war. These homes receive over 700 applications for entry each year. Most old people still live, and perhaps die, in private houses, but under conditions which impose a considerable strain and hardship upon themselves and upon their children, who find it increasingly difficult to fulfil their filial obligations, no matter how great their desire to do so.

It seems clear that a system of care for the aged, similar to that which Dr. Vischer has established at Basle, should have much to commend it in this country at the present time. Homes or hostels should be readily provided for those who need them, and it should be possible to arrange for a certain degree of privacy and seclusion to be available to all. In this, and indeed in many other ways, the Royal Hospital at Chelsea, founded by Charles II in 1694 for 500 pensioners from the army, still leads the way in this country for its intelligent and humane treatment of the old. There, in the large ward, each pensioner has his own small cubicle, into which he can shut himself whenever he pleases, he has a

Old Age

monetary allowance for beer and tobacco, is provided with a wardrobe that might almost be called extensive and is allowed a considerable degree of personal liberty.

Great though our need is now for proper provision for the aged, it may well become greater, and for reasons which we hardly suspect. Under the control, as a rule, of the Public Assistance Committees of the major Local Authorities there are in this country a number of Institutions which provide between 60 and 70,000 beds to accommodate the chronic sick. Not all of these people are old; about thirty per cent of them are under the age of 65. But, in the majority of these Institutions, no attempt has been made either to classify or to treat these unfortunates, and the legend has got around that the chronic sick patient is irremediable; in fact all that he requires is a bed and good nursing. In recent years, however, a few doctors have taken a different view and have shown not only that a large number can be relieved and returned either to their own homes or to a hostel, but that an even larger number need never have become chronically sick at all. This means, of course, that a large number of hospital beds could be vacated, and nurses left free to do their proper work. Obviously such beds would not be in good, modern hospitals; but, with ingenuity, a great deal could be done to improve all but the worst of the Institutions concerned. This is important, because in England it is likely to be a long time before we have the opportunity for large scale hospital building.

If, therefore, suitable large houses can be obtained, bearing in mind their proximity to a large general hospital, to house the aged with as little disturbance to their normal life as possible, a great step will have been taken to overcome many of the dreads of old age—loneliness, the fear of being a burden to one's children and, worst of all, fear of the workhouse. For, no matter the name by which that building is called to-day, it always has been, and always will be, for most old people "The Workhouse."

AMULREE.

PREFACE TO THE SECOND EDITION

EIGHTEEN months after publication a new edition of my book has been called for. Further, a Swedish translation has appeared, the work of Lic. phil. E. Sköld. A Hungarian translation is in preparation. An Italian translation, which was almost completed, was unfortunately held up by the war.

For this second edition, I have received valuable suggestions from various sources. In particular, I have to thank Prof. R. Bing (Basle), Prof. A. Portmann (Basle) and Dr. Robert Rahn (Cairo). I learned, from numerous letters—and this gave me special satisfaction—that my book has brought consolation and encouragement to many old people. The writing of it has given me fresh insight into the problem of old age, though it has also led me to realize the immensity of the problem. So, with Solon, I am fain to confess:

“Learning with never a halt onward I pass toward Age.”

Basle, January 1945.

*Qu'on ne dise pas que je n'ai rien
dit de nouveau; la disposition des
matières est nouvelle.*

PASCAL.

INTRODUCTION

THE American philosopher, John Dewey, relates, in the preface which he wrote for E. V. Cowdry's comprehensive work on the problem of old age, that he was once asked, by a person well known in the public life of North America, for information respecting books on the psychology and sociology of old age. This query greatly embarrassed him, for he could not give the inquirer the titles of any such books. "It is strange," said the latter, "that the one thing that every person looks forward to is the one thing for which no preparation is made!" Dewey added, that at the time of writing the situation was hardly changed; except that by then the problem of old age had moved into the foreground.

Primitive man, like the child, apparently gives no thought to the process of growing old; he lives for the passing day, like the man of the Homeric era, who knows, of course, what an old man is, and also sees that men grow old, but does not look forward so far as to think of his own old age. Human life is the place where primitive man encounters time most immediately—where he experiences it in his own person. The primitive man "sees youth and age, for the most part, not as temporal vital processes, but in their objective being, with their inherent content of manifold powers and disabilities, advantages and disadvantages. . . . But he never, unless a divine prediction reveals to him what is to come, feels himself, in the present tense of his active life, to be in the power of the future. In this respect we are not far wrong if we regard the people of Homer as big, happy children" (*Schadewaldt*).

We find something of such a mental attitude in those

Old Age

fortunate men of the passing day who are burdened with no memories of the past, and who do not trouble their heads about what the future may bring. But he who has eaten of the tree of knowledge must even here pay the price, when he considers, as one who knows, the course of his own life. Even though a certain tragedy resides in the mere knowing, nevertheless we would know the truth!

Nearly twenty years' work as physician in the Old People's Home of the city of Basle has brought home to me the problem of advancing age in all its manifold aspects; while the society of aged people has enabled me to understand something of the changes that occur in the psychic life. In many branches of science the problems of advancing age are lightly touched upon; in *belles lettres* and the plastic arts we may find a wealth of profound understanding of spiritual senescence. By this treasury of knowledge we have profited to some extent. But such a problem cannot be exhausted, for life is immeasurable. I have found guidance in Goethe's saying: "As far as that goes, I find everything detestable that merely informs me, without increasing my power of action or stimulating me directly." The activity which should be stimulated by medical knowledge is that of helping. It should be helpful to know more about age and senescence; it should help the ageing man to understand his own destiny, and it should help the young to understand the old.

CONTENTS

	PAGE
FOREWORD BY LORD AMULREE, M.D., F.R.C.P.	5
PREFACE TO SECOND EDITION	9
INTRODUCTION	11
I. SENESCENCE AS A BODILY AND MENTAL PROCESS	
<i>Growing Old</i>	19
<i>Building Up and Breaking Down</i>	22
<i>The Phenomena of Age</i>	23
<i>Beginning and Cause of Old Age</i>	30
<i>The Psychic Process of Ageing</i>	36
<i>The Psychology of Old Age</i>	44
<i>Typology of the Stages of Life</i>	50
<i>The Sense of Life in Old Age</i>	58
II. THE DURATION OF LIFE	
<i>The Chronological and Physiological Stages of Life</i>	65
<i>Concerning Longevity</i>	74
<i>The Centenarians</i>	77
<i>Old Age and Longevity in the Animal World</i>	82
<i>Prolongation of Life and Rejuvenation</i>	92
<i>Maladies of Old Age, and the Care of the Aged</i>	108
III. SOCIETY AND THE INDIVIDUAL: THEIR ATTITUDE TOWARD OLD AGE	
<i>The Problem of Old Age in Other Civilizations</i>	117

Old Age

	PAGE
<i>The Community and the Problem of the Generations</i>	132
<i>The Old Generation and the Young</i>	142
<i>Valuations of the Aged</i>	155
<i>The Achievements of Old Age</i>	160
<i>The Achievements of Women in Old Age</i>	176
<i>The Personal Attitude toward Old Age</i>	184
<i>Bibliography</i>	196

ILLUSTRATIONS

I. <i>The "Lichtgut," near Signau, Canton Bern</i>	facing page 48
II. <i>Titian. Christ crowned with Thorns, 1542</i>	between pages
III. <i>Titian. Christ crowned with Thorns, 1570</i>	80-81
IV. <i>Tintoretto. The Marriage in Cana, 1561</i>	
V. <i>Tintoretto. The Last Supper, 1591-4</i>	128-129
VI. <i>Lorenzo Bernini. Cardinal Scipione Borghese, 1632</i>	
VII. <i>Lorenzo Bernini. The Physician Gabriele Fonseca, 1670</i>	160-161
VIII. <i>Auguste Renoir. Jeune Fille, 1889</i>	
IX. <i>Auguste Renoir. La Bergère, 1903</i>	176-177

I
SENESCENCE AS A BODILY
AND MENTAL PROCESS



GROWING OLD

WHILE we shall try to give some account of the processes of bodily and mental senescence, we are well aware of the difficulty of such an undertaking. We may well begin by citing the opinions of two inquirers who gave special attention to the problems of age and senescence. Here is what Elie Metschnikoff had to say: the bacteriologist and Nobel prize-winner (1845-1916); "Science knows very little about old age and death." And quite recently Professor M. Bürger has told us that "a very great deal of exacting work has yet to be done before we can really understand how to register the physiological limitation of the functions with increasing age."

By meticulous research we have endeavoured to observe and analyse all the anatomical, physiological and physiochemical alterations which occur in the ageing organism. Every one who has concerned himself with this problem knows that this branch of research is still in its infancy. While the study of the period of growth is facilitated by the orderly succession of the processes of growth and puberty, the contrary process of involution does not follow such definite laws. Actually, the ageing organism can be understood only as the result of the preceding life-history. To a great extent, the process of ageing follows laws peculiar to the individual. Every individual reveals, in advanced age, the traces of his own life-history. The ageing man bears the runes of his life, not only in his face, but in the whole of his person. In this sense every old man displays a characteristic mask. Just as plasticity is the inherent property of all living things, so the enduring impress of the environment is an essential phenomenon of age. A further factor, which increases the difficulty and complexity of our inquiry, resides in the circumstance that ageing—that is, involution—seldom occurs independently and alone, but is almost always com-

Old Age

bined with or masked by morbid processes. It is therefore extremely difficult, in the case of an ageing organism, to determine where involution ceases and where disease begins. It is doubly difficult, for in respect of various processes which we observe in the ageing organism the scientist himself cannot decide whether they should be described as merely conditioned by age, or as pathological. And lastly, there are certain scientists who consider that senescence is in itself a pathological process.

All that has hitherto been said of physical senescence applies also to mental or spiritual senescence.

Human life does not proceed at the equable pace of evolution. After the relatively brief space of nine months in the mother's body begins the period of evolution and growth. This is followed by the period of maturity. Then the vital curve begins to sink. The period of the falling curve is marked by the reverse process of involution. It is extremely difficult for the physician to indicate exact limits for the various periods of life. One individual may appear to us to be, without question, precociously mature, and this precocity may be manifested physically as well as mentally; another will age very late in life, and on examination will show hardly a trace of those alterations which are regarded as characteristic of old age. If we attempt to undertake the division and differentiation of the classes of senescence we must not take the state of the organs alone as our standard. In all writings on the subject of senescence we come, over and over again, upon the aphorism of the French physician Henry Cazalis (1840-1909): "A man is as old as his arteries." And now Ludwig Aschoff has shown that for the blood-vessels the prime of life is of very brief duration; in the case of the arteries, for example, all growth ceases about the 33rd year; and ten years later the first alterations characteristic of age begin to appear. Aschoff says, very truly, that man is primarily not a vascular but a cerebral creature. But even anatomical research into the brain contributes no final answer to the solution of our

Growing Old

problem. We know when the cerebral nervous system has finished growing, and when it has attained its maximum weight; but we cannot determine from the dead brain the state of the cerebral function. In delimiting the periods of human life we must take into consideration not only the state of the substance and the form of the human body, but also the compass and the content of the total performance of the individual. From this point of view we shall describe as the prime of life that period in which the man achieves his position in life and in which the woman is passing through her phase of fertility. For both men and women, in our climate, this should be roughly the period between the 25th and the 45th year. But even here we find a lack of symmetry between the sexes; the period during which the man is fighting to establish his position in life may extend beyond his 50th year, and the fertile period of the woman may of course begin before the 20th year. Aschoff assigns all the factors that play their part in the prime of life—that is, in the years of actual maturity, in man and woman—to the period of evolution, and all that follows later to the period of involution.

Since in most cases the downward slope of the vital curve of the individual is in the beginning only very gradual, it is often difficult to say when the actual process of involution sets in. The various changes which are connected with involution occur singly, and insidiously; only when a considerable number are present do they become easily recognizable.

We do not yet know whether there is a law of senescence, valid for the whole organism, in accordance with which the individual organs and tissues age simultaneously and harmoniously. M. Bürger and his school advance this opinion. It is difficult, however, to accept such a simultaneous ageing. For example, consider the lens of the eye, in which, as we shall see, visible signs of ageing are perceptible as early as the 20th year. Not all the organic systems age simultaneously. In one person the muscular system grows old;

Old Age

in another the bones; in a third the circulatory system; while the digestive or respiratory systems are still functioning perfectly. But the weakening or loss of a given function results in the beginning or the acceleration of the processes of involution in other organs.

BUILDING UP AND BREAKING DOWN

AGE and senescence confront us with the problem of the ageing of the protoplasm, the living substance of the cells; so far this problem remains a mystery. But after all, one may ask, is the problem of the ageing of the protoplasm, and of involution, more mysterious than the problem of the evolution and the growth of the protoplasm?

As a matter of fact, in the human organism, from the moment when the sperm-cell unites with the ovum, both processes are in operation at one and the same time. In the words of Rudolf Virchow (1821-1902): "The tissues of the body do not all come into existence at the same time, and they do not all die at the same time; youthful tissues occur in extreme old age, and senescent tissues in the foetus."

During the period of growth the process of building up is predominant; during the period of senescence that of disintegration and involution. Exhaustion and involution do not set in suddenly; nor do they affect simultaneously all the organs of the body. Indeed, there are organs, like the Okenian bodies, whose task is fulfilled before the child leaves its mother's body, and which thereupon perish. The thymus gland begins to act in puberty, and is atrophied in old age. Again, the fate of the milk teeth is an example of premature decay. Not unjustly, life has been described as a gradual dying. At all events, in every period of life something in us dies. At every childbirth we can observe, in one organ, all the signs of age as they occur in the very old: in the tissues of the placenta; here we find sclerosis and

The Phenomena of Age

calcification of the arteries, cellular hypertrophy, atrophy and degeneration of the villous integument and the epithelium of the chorion, with calcification of the chorion. The placenta, even while it exercises its function, runs through the stages of evolution, maturity and involution. In the placenta, as we see it in the grip of involution, we can study the entire pathology of old age as it will one day recur in the organism to which the placenta, in the mother's womb, has transmitted its life.

THE PHENOMENA OF AGE

SENESCENCE begins when the phenomena of atrophy predominate, become more emphatic, and are externally perceptible. In the involution of age we encounter always the same picture; it has been formulated by Élie Metschnikoff: Atrophy of the higher and specific elements of the tissues and replacement of the same by hypertrophic connective tissue. In the brain the nerve-cells disappear, that is, those cells which perform the highest functions; giving way to the elements described as *neuroglia*, the supporting tissues of the nerve-centres. In the liver the glandular cells which play an important part in the process of nutrition are ousted by connective tissue. This same connective tissue invades the kidneys also, choking the channels which are necessary in order to rid the body of a number of waste materials. The process of ageing reveals itself to us as a conflict between the nobler elements, which serve the higher functions, and the simpler, primitive elements in the organism—a conflict in which the latter are victorious. Their victory finds expression in the weakening of the mental faculties, digestive disturbances, and the imperfect purification of the blood.

One essential ageing process is the gradual draining or comparative dessication of the organs. This dessication is accompanied by the lessened power of absorption and permeability of the tissues, and increasing density of structure (L. Lichtwitz). The tissues are found to contain less and

Old Age

less water, and lose their capacity of retaining water. The loss of water from the tissues results, after the 70th year, in a reduction of $5\frac{1}{2}$ lb. in the weight of the body. These alterations are particularly conspicuous in the skin of the senescent human being. Together with the physical bearing, the skin is principally responsible for the look, the general impression, and the estimation of age. The withering of the skin begins in those parts which are most exposed to external influences; on the face and hands. The skin grows thinner, owing to the shrinking and atrophy of the epidermis, and in consequence of the loss of water. The disappearance of the elastic elements results in the loose, corrugated, wrinkled condition of the skin. The diminished excretion of sebaceous matter and sweat explains the dryness of the skin. The pigmentation of the skin increases. On the backs of the hands and on the face brown spots appear; while warts and callosities may occur. The veins increase in diameter, and become more visible under the thin covering of skin. It is precisely these alterations of the veins, together with the dryness of the skin, that give the old person's hand its characteristic appearance.

Other signs of old age are the whitening and the falling out of the hair. But we know that in many persons the hair may turn white in early life, without the appearance of any of the signs of age. As regards the hair, too, we note the remarkable fact that besides atrophic changes there may actually be increased growth. We very often see a growth of hair in unaccustomed places, as in the ear or in the eyebrows, which are transformed into thick, bushy tufts of hair. Old women, too, often grow beards; just as the feathers of the ageing hen begin to resemble those of the cock, while those of the cock become like those of the hen. Female giraffes acquire the colouration of the male; hen pheasants the lustre of the cock, and ducks the curly tail-feathers of the drake; while the hind of the red deer and the roe deer grows antlers. The distinctive character of the sexes become less obvious in old age, and often enough it is by no means

The Phenomena of Age

easy to tell, from the appearance of the face and the tone of the voice, whether an aged person is of the male or the female sex. The feminine voice loses its high pitch, its purity, and its flexibility. Further, old women develop masculine tendencies, such as an appetite for a more abundant and stimulating diet, and for spirituous drinks. The feminine character, when its possessor enjoys good health, uninterrupted by menstruation, gains in stability and decision. Delicacy and tenderness are not rarely replaced by an almost masculine vigour and bluntness.

The skeleton undergoes manifold alterations with increasing age. As early as the 50th year there is a measurable diminution of the bodily stature; the cause of which resides in changes in the inter-vertebral cartilages of the spinal column, which grow thinner, smaller and, above all, drier. The normal inter-vertebral cartilage acts like a water-cushion between the individual vertebræ. As it loses moisture, any shock sustained by the spine is transmitted more forcibly to the annular cartilages and bony components of the spinal column. The aged person assumes a stooping posture, as a result of the changes in the spinal column and the relaxation of the musculature of the back. The bones in general grow brittle and poor in calcium; a phenomenon which, strangely enough, is much more conspicuous in women than in men. The diminished elasticity of the costal cartilages results in rigidity of the thorax. Even before the 40th year a diminution of the lung-capacity may be noted. At the same time the muscular fibres begin to disappear and are replaced by connective tissue. In consequence the muscles become less efficient, grow denser, and are more quickly fatigued.

It will be readily understood that fatigue occurs in individual tissues; that is, fatigue of the material tissue, as the engineer understands it. Excessive demands on the elastic fibres of the lungs may result in such fatigue, and such a process helps to explain the occurrence of emphysema. In arteriosclerosis, too, which we shall presently have to con-

Old Age

sider, it has been suggested that material fatigue is present. It is possible that such fatigue plays a greater part in pathological states than has yet been realized.

Senescence itself has been regarded as fatigue of the organism. Old people very often complain that they quickly become fatigued. Physical and mental weariness are regarded as typical symptoms of senility. Now, we know, thanks to the researches of Friedrich Kraus, that persons suffering from cardiac affections are readily fatigued. It is therefore possible that the increased susceptibility to fatigue which is sometimes the first observable symptom of age is due to lesions of the circulatory organs. Rudolf Staehelin very sensibly asks whether the increased susceptibility to weariness should really be regarded as a consequence of fatigue. "The very fact that ageing is by no means in proportion to performance is inconsistent with its explanation as fatigue. The saying that so-and-so has worn himself out by hard work is all very well in a press obituary, but it has very little relevance to the objectively determined facts."

Especially decisive, in the process of ageing, are the alterations in the blood-vessels. As a matter of fact, in the course of life the blood-vessels become wider, longer, and thicker. But this change is not a real and healthy growth, an increase of efficient tissue. Such growth occurs only as far as the middle years of life—up to the third and fourth decades. From this point onwards growth is only apparent; in reality what is happening is the incorporation of less extensible and less elastic connective tissues. The pathologist W. Hueck draws a sharp distinction between this process and that of arteriosclerosis, which appears in patches, affecting individual regions of the vascular system in different degrees. But we may assume that the general histological changes in the walls of the blood vessels favour certain derangements of metabolic process, and so facilitate the occurrence of arteriosclerosis. The transition from the general alterations in the blood vessels, as a phenomenon of deterioration, to

The Phenomena of Age

localized arteriosclerosis, as a malady of exhaustion and old age, is often smooth and continuous.

Just as in human beings, so in his examination of the arch of the aorta in ageing horses and cattle, M. Bürger noted dessication of the tissues, increased thickness of the wall, and the deposition of waste matter.

Besides the alterations in the great blood-vessels, which are highly characteristic and significant of the ageing process, the changes in the capillaries are perhaps deserving of greater attention. Examination of the capillary blood-vessels in aged individuals has shown that these very often exhibit alteration and deterioration; they may be enlarged, or shrunk, rigid, brittle, or flabby. It has also been ascertained that the permeability of the walls of the capillary vessels is very largely destroyed. The circulation of blood in the capillaries is conspicuously retarded.

The changes characteristic of age in the sensory organs are manifold. In the eye the incidence of long-sightedness is a distinctive and easily determined symptom of senescence. Spectacles become a necessity. The changes in the lens of the eye begin to make their appearance quite early in life. An elderly professor of my acquaintance took a special delight in proving, to a twenty year old student, that the latter was already growing old; for the range of accommodation of which his eyes were capable was already less than that of a child of five. The lens, which in the newly-born child is extremely elastic, shows perceptible signs of ageing as early as the 15th year, in consequence of the instability of the colloids. The lens is no longer capable of adapting its form to various optical requirements. The sensitiveness of the ear to the higher tones is greatly diminished; the tonal 'ceiling' is considerably lower. "It is for this reason that old people can no longer hear the chirping of crickets, a material part of the summer nights of their youth, which, like so many other things, recur amid the memories of the aged, whose thoughts are still dwelling on the past. In the mood so characteristic of the very old,

Old Age

Grandpapa declares that 'there are no crickets nowadays, and that as compared with the good old days the world has altered greatly for the worse' " (*Lichtwitz*).

The sexual function is of special importance in the process of senescence. In the woman it ceases altogether some time between the 45th and the 55th year. In the man the case is different. Much has been written concerning the male climacteric, and it has even been stated that the secretion of semen ceases at the age of 65. This is a purely arbitrary assumption. As a matter of fact, we have no evidence that there is any definite age-limit in respect of the formation of semen. There are numerous instances which prove beyond a doubt that the procreative power of the man may continue even in extreme old age. The significant fact should never be overlooked, that in woman the sexual function ceases in the middle years of life, and in man very often only at the chronological end of life. For this there are teleological (i.e. purposeful) reasons. Nature is in all things logical; she is no more than consistent in allowing the woman to survive the disappearance of the sexual function, while the man is still essentially a male even in extreme old age.

In the brain the changes due to age are marked by pigimentary deposits consisting of waste matter; at all events, this pigmentation is not unusual in the brains of old persons, whereas it does not occur in the brains of the young. Other changes in the brain are the minute foci of softening which are observed most frequently in the region of the ganglia of the base of the brain. Among the pathological phenomena, on the other hand, are the numerous and manifold changes arising from arteriosclerosis.

But these tell us nothing definite as regards the changes in the intellectual faculties. As a matter of fact, it is extremely difficult, on the basis of histological data, to form any opinion of the mental efficiency of the brain. Moreover, it not infrequently happens that in the brains of very aged persons there is nothing abnormal to be observed.

The Phenomena of Age

Aschoff draws attention to the fact that the brain often ages far more slowly than the other organs. Even on the biological plane the activity of the human brain occupies a very special position.

One symptom of old age is the increasing defencelessness against certain maladies. Illness becomes increasingly frequent in old age. In this sense, as a man grows older he reaches the dangerous age. As we have already seen, as regards the signs of old age in the blood-vessels, certain processes of deterioration, of wear and tear, form a basis for the occurrence of the maladies of old age. But, just as in the case of the blood-vessels, we must distinguish between the signs of deterioration and old age and the maladies of exhaustion and senility. It is often very difficult, indeed it is frequently impossible, to draw the line; yet the distinction is essential to a full understanding of the problem of old age. An old man in mental health will accommodate himself to the appearance of age, but the maladies of old age will depress him. Wherein lies the difference? Hueck answers the question as follows: "The advent of old age is a condition to which the organism as a whole is capable of adapting itself. We experience it as a defect, as a modified and also diminished capacity for work; but in illness the limit of accommodation is passed. Here the transformation no longer marks time; it proceeds so rapidly that there is no longer strength to suffice for the demands of everyday life. If we recognize this imaginary boundary as actually existing, it will be understood that the natural vital processes of deterioration will lead to the maladies of age only when there is an increasing disproportion between demand and performance."

Healthy senescence should be a normal process, characterized by a progressive decrease of vitality, and by atrophy—that is, shrinkage; but free from pathological changes. Such old age is hardly known; at all events, it is extremely rare. By their 60th year or earlier most human beings have developed some focus of infection, emitting toxins which

Old Age

damage the ageing tissues. Arteriosclerosis is of such frequent occurrence in persons of advanced years that it has been described as a necessary evil, and even as the cause of senescence. On the other hand, it must be kept in mind that arteriosclerosis is a pathological condition which is intimately connected with old age, and is indeed one of the commonest maladies of age. Its cause is to be sought in mechanical, chemical, infective and nervous traumata which attack the arterial wall in the earlier phases of life and present their full reckoning in old age.

BEGINNING AND CAUSE OF OLD AGE

WHEN does old age begin? To this question we receive conspicuously different answers. Hippocrates reckons that old age begins with the 56th year. With Dante old age begins with the 45th year and ends with the 70th; anything beyond that he describes as senility. Laccassagne, professor of medicine in Lyons, and the author of a work on senility which was greatly esteemed in its day, calls the period between the 60th and 70th years the springtime of old age; the years from 70 to 75 are the years of green old age; from 75 to 80 is the period of true old age; *la vraie vieillesse*, which is followed, from 80 to 90, by extreme old age. According to Flourens old age begins at 70. Even in popular parlance the outset of age is variously timed. Consider, for example, a familiar German rhyme: "40 Jahre stille stahn, 50 Jahr gehts Alter an"—"At forty years age stands still; at fifty years begin it will." But elsewhere the rhyme runs thus: "40 wohlgetan, 50 stillestahn, 60 abegahn." "At sixty, off we go!" Aschoff makes the period of involution begin at the age of 45, dividing it into the phase of ripe age (between 45 and 65) and the phase of true old age (from the 65th to the 85th year). Those who attain or pass the age of 85 he counts as the very aged, who

Beginning and Cause of Old Age

constitute a special class. In determining these separate phases of the period of involution, Aschoff relies on function. Whereas in the phase of ripe age (between the 45th and the 65th year) the phenomena of involution appear only in such a degree that the customary independence, above all in the performance of professional duties, is not affected thereby—or, at least, not perceptibly affected—in true old age a phase begins in which this discretion and independence gradually diminish. In this phase the individual, in the matter of self-preservation, is in the same position as the majority of his contemporaries, but he cannot face the vicissitudes of life in all directions as he could in the ripe phase of the period of involution. This lack of independence becomes plainly perceptible in the very old, so that in many cases the aged person is obliged to rely on the help of others in matters of everyday life.

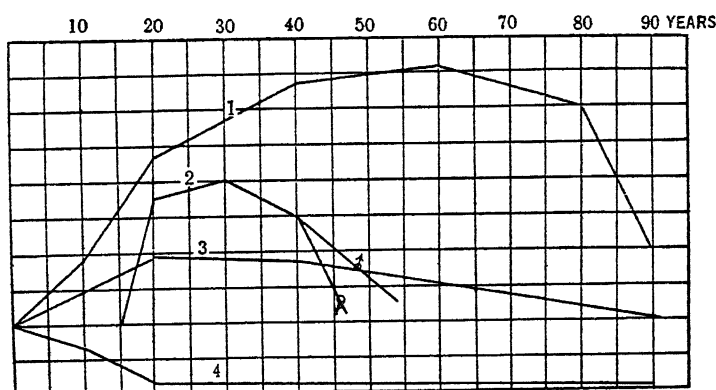


FIG. 1

CURVE OF VITALITY, ACCORDING TO STRATZ, WASTHIN AND LIGHTWITZ.

- | | |
|-----------------------|-----------------------------------|
| 1. Mental capacity. | 3. Physical capacity and fitness. |
| 2. Procreative power. | 4. Metabolism. |

Now, it is a matter of daily observation that the incidence of old age varies very greatly, not only in different individuals, but also in different families or clans. Also, the onset of old age may be very largely affected by morbid

Old Age

processes. How often do we see that a man appears perceptibly aged after his recovery from an illness! This is most frequently and strikingly the case when the period of convalescence has been unduly restricted. It is for this reason that elderly people are warned that they should not be in too great a hurry to resume work after an illness or an operation.

The great difference to be observed in different individuals, as regards the beginning of old age, is due in some degree to the subjective attitude to old age. Professor Roch, of Geneva, has truly said: "For every one who writes about old age it begins a few years later than his own age at the time of writing." Since—as we have seen—the progress of ageing is by no means uniform in the various functions, our judgment depends on the particular functions to which we give priority and attach the greatest significance. The attempt has often been made to represent by a graph the evolution and involution of the various functions during the course of life. We find such a graph in a treatise by C. H. Stratz. Fig. 1 shows this graph, as modified by A. S. Wasthin and Lichtwitz.

Of course, such a graphic representation of the vital curve can give us only a very general notion of the facts. It is the life-graph of a hypothetical person, intended to show that every period of life has its physiological range of activity and ascendancy. Consequently each category of age has its individual possibilities, its own values, its own honour and dignity. It is obvious, of course, that the great differences and variations of the process of senescence in different individuals, and also the different rate of ageing observable in different organs, cannot be thus represented. This is especially the case as regards the sphere of intellectual productivity. In highly gifted and original characters we often find that the vital curve follows a completely individual course.

The natural end of age, when it is not complicated by illness, is death from old age. But this biological termina-

Beginning and Cause of Old Age

tion of life is extremely rare. Robert Roessle, of Berlin, having performed 16,000 autopsies, found only one such case. A. S. Wasthin, of the University of Michigan, states that in his 38 years of practice as a pathologist he has encountered only twenty-five cases in which death was actually due to old age. In these cases atrophy and debility of the cardiac muscles were noted, in the absence of other pathological changes.

Death from sheer old age is therefore death from heart failure.

Ludwig Aschoff never came across a case of purely natural death from age. He learned by experience how often, in persons of great age, a malady may run its course without external symptoms, until the autopsy provides a surprising explanation. He gives the following example of such a case:

"When I visited a 97 year old physician only two days before his death he was so far from exhibiting the symptoms of serious illness that I was convinced, on receiving the news of his death, that at last I had before me a case of death from natural causes. I was greatly surprised, at the autopsy, performed in accordance with the wish of the deceased, to discover a severe lobar pneumonia of at least four or five days' duration, and numerous metastases of a malignant tumour of the thyroid. The old man himself had failed to diagnose this trouble, although with his expert knowledge he was of course quite capable of doing so, and although he had constantly observed his own case."

After all that we have learned of the morphological and functional processes of senescence it would seem as a matter of course that one should not be content to establish the mere fact of these processes, but that we should seek to discover the cause of senescence, and inquire into the incidence of the ageing process. There have been many attempts to explain the process of senescence, and it is interesting to note that these attempted explanations and theories in respect of the process of senescence reflect, more

Old Age

or less accurately, the development of biological science, and the morphological and physiological knowledge of the structure of the human body and its functions. In a later chapter we shall have to look more closely at some of these theories, since they served as the starting-point of certain macrobiological experiments and attempts at rejuvenation.

Among the best known of these theories is that of Élie Metschnikoff. This dates from the time when medical theory was completely governed by the science of bacteriology. Metschnikoff saw the cause of old age in the invasion of the body by toxins from the intestines. The pathologist Ribbert found the starting-point in the changes observable in the ganglion-cells; the clinician Naunyn in the processes of metabolism. Conklin and Child were able to show that in the lower animals the processes of oxidation in all the tissues begin to decline with age, so that they regard the process of senescence as intimately related to the metabolism of the cellular protoplasm. Marinesco and Lamière advanced the theory of colloidal decay, which attracted much attention. Carrel believed that in the ageing organism there is an accumulation of substances which impede the vital processes. He was able to support this theory by some very interesting experiments. It is well known that individual organs and portions of tissue can be kept alive for indefinite periods if nutritious substances are regularly added to the human or animal serum in which they are bathed, and if the waste products are removed by the periodical change of the surrounding fluid. Now, Carrel has observed that the cellular growth of the tissues is very strikingly retarded if the surrounding serum is derived from aged individuals. He concludes from this that senescence is accompanied by a deterioration of the fluids of the body, a progressive cachexia.

The Italian research workers, P. Bastai and G. C. Dogliotti, in their theory of senescence, do not attempt to point to a special and isolated factor, but seek rather to explain the mechanism by which the phenomena of age are

Beginning and Cause of Old Age

caused, as due to defective nourishment. They base their theory on a fact established by Carrel. A portion of tissue which is to be maintained in the living state must be kept in a container whose volume is ten times that of the portion of tissue. Otherwise the tissue will be poisoned by the waste material of its own metabolism. According to this, the human body would require 200,000 litres of nutritious fluid. It is only thanks to the wonderful circulatory system, which provides the body with nutriment and rids it of its waste matter, that our tissues are able to live with 7 or 8 litres instead of 200,000.

Carrel's observations enable us to form some notion of the tremendous process of cell-nourishment. It is difficult to form a correct idea of the extent of the capillary circulation. Krogh has calculated that the capillary vessels of the whole body, if placed end to end, would cover a length of nearly 60,000 miles, and that the area of their collective surface is about 60,000 square feet. Over this area the 8 or 9 pints of our blood are distributed. This volume of blood is constantly operating reciprocal exchanges with the fluid in which the blood-vessels themselves are bathed; this amounts to perhaps $3\frac{1}{2}$ pints, and this also is distributed over an immense area. Once we have realized these facts we shall understand the saying that the cells of the tissues exist in a sea whose waters bring them their food and carry off their waste products. The volume of liquid which is placed at the disposal of the body for the purpose of carrying away these waste products and keeping the composition of the bodily fluids constant is about $3\frac{1}{2}$ pints a day. This is roughly the volume of liquid excreted in the urine, in the exhalations of the skin, and in the breath. Our knowledge of the capillary circulation, the irrigation of the tissues, and the nourishment of the cells enables us to understand the importance of the circulation in the metabolism of the tissues and cells. With this the old saying that "a man is as old as his blood-vessels" acquires a fresh significance. We have already spoken of the deterioration of the capillaries in old

Old Age

age. We can now understand the consequences of such deterioration. Bastai and Dogliotti see in the changes undergone by the capillaries the most important factor in the incidence of senescence.

But all these theories have told us nothing about the primary cause of ageing. Here we can only agree with the fundamental statement of Bastai and Dogliotti: "The actual cause of old age is an insoluble problem, which is best left to the speculations of philosophy."

Biology, the science of the phenomena of life, has to presuppose life itself as "given." But with life old age and death are inextricably conjoined. As to what lies behind the phenomena, and where the cause of life is to be sought, biology can give us no answer.

THE PSYCHIC PROCESS OF AGEING

ANY consideration of the psychic or spiritual aspect of old age must begin with an analysis of the notion of chronological age. Here we encounter the same difficulties as in the analysis of bodily senescence, inasmuch as the demarcation of the period of old age is subject to great individual variations. The best that we can do is to rely on functional data. Exhaustive examination of the bodily processes in the later phase of life leads us to divide this period into two sections, in the first of which functional defects are noticed by the ageing person, or those about him. This functional efficiency, however, may be so far compensated by the mobilization of internal energies that it is not felt as a pathological condition, and is not noticed by persons in the environment. The psychiatrist Ferdinand Kehrler has described this state of affairs in the following formula: Necessity of accommodation together with capacity for accommodation. The next phase is characterized by the fact that the powers of accommodation are no longer

The Psychic Process of Ageing

adequate, but fail to operate. Here the formula becomes: Necessity of accommodation together with failing capacity for accommodation. The faculty of accommodation, in the presence of the physical necessities of accommodation—that is, the faculty of dealing with the incipient deficiencies and difficulties of incipient old age—is now, in the widest sense, a psychic function. It becomes apparent that even in old age the physical can hardly be separated from the psychical.

The antithesis, need of accommodation and capacity for accommodation, can be reconciled with the two-phase theory of the progress of the psychical life in old age as stated by the psychologist von Bracken (of Bonn). In advanced old age there is undoubtedly a decrease of intellectual efficiency. Here we are speaking of extreme old age; but chronologically speaking, it is this decrease of the intellectual faculties as a whole that is usually to be seen in the septuagenarians and the nonagenarians. In this sense, some people grow old earlier than others, and some very much later. The actual period of advanced old age is thus the time when there is a general diminution of mental efficiency. It is the second phase of old age. Even in the first phase the intellectual faculties are not unaffected; in certain respects there is even here a decrease of efficiency, while in other respects there is an indubitable increase. In this first phase, therefore, there is compensation; there is not as yet an essential quantitative diminution; the changes in respect of psychical efficiency or output are predominantly of a qualitative nature. Thus, von Bracken sees, in the first phase, not so much a downward tendency as a regrouping of the intellectual faculties.

Von Bracken's two-phase theory, and Kehrer's antithesis: necessity of accommodation and faculty of accommodation—schematic though they may appear, do none the less help to clarify our ideas. How necessary such clarification is becomes apparent if we compare the few attempts to present a general picture of the psychical life in old age. First of all, we will take that of Karl Friedrich

Old Age

Burdach (1776–1847), the physician and physiologist of the Romantic period, who was always especially interested in the problem of the generations. Then Friedrich August Carus (1770–1807), in his *Psychologie*, dealt with the problem of the course of human life and the different ages of man, a problem which has been considered again in our days by Charlotte Bühler.

Burdach's general survey will be found in Vol. 3 of his work, *Vom Bau und Leben des Gehirns und Rückenmarks* (Leipzig, 1819–25).

“The character of extreme old age consists in the fact that the psychic life is introverted. *Intercourse with the outer world is diminished*; but if the outer world alone possessed any value for the individual, if he has neglected the cultivation of the inward impulses rather than the outward, then indeed extreme old age is the *caput mortuum* of life. As the senses and the powers of movement fail, so activity declines; the turmoil of society confuses the mind, the urgency of business affairs becomes oppressive, the longing for peace and quiet increases. . . . The old man has to depend more upon himself. This process begins with the loss of procreative power and the establishment in life of his sons and daughters. For as the latter, in order to lead their own lives, leave the parental home, it is only natural that the young should to some extent avoid the old, as beings of a different kind, and enjoy themselves in their own way. But as the years go by a great proportion of the old man's contemporaries die, and he finds himself alone, in the midst of a generation formed under different circumstances, whose ideas and manners are alien to him, and with which he has few points of contact, if only by reason of the differences of age. So he feels less and less sympathy for this new generation; for one thing, he can no longer do so much for others, but has to think more of himself, as a matter of self-preservation; for another, familiarity with the sight of distress has made his heart colder. Generally speaking, his susceptibilities are diminished both in range and in degree;

The Psychic Process of Ageing

he is indifferent to much that interested him keenly in earlier life. His emotions are calmer and less frequent. His power of assimilating new ideas and of doing unaccustomed things is lessened. He easily forgets what he has recently experienced, or what he himself has said or done; he takes longer to think anything out, and like his power of intellectual assimilation, so his intellectual productivity is diminished; new and substantial creations, which call for exalted flights of the imagination, are no longer produced: and while there are instances of very old men who have produced intellectual achievements of great perfection, these latter were partly works of ripe judgment and deliberation rather than creative imagination, partly formations which had developed themselves in the mind at an earlier period, and partly the fruits of a momentary intension of the psychical life. . . . The second trait which results from the increasing inwardness of life in the aged man is *adherence to the results of earlier striving and achievement*. But where nothing of lasting value was achieved in earlier life, the old man has nothing to hold on to; the intellectual acquisitions of earlier years nourish the vitality of later life. Another peculiarity of the old man is to cling to general rather than individual results. Since the power of acquisition is diminished, so is the effort to retain and enjoy what has been acquired; yet the principle of continuity is predominant. In the old man everything is more static, and since he insists that habit and custom shall be respected, all his inclinations and desires are more definite and more tenacious. He is therefore distrustful of innovations, and is readily tempted to regard the deficiencies of the new era too harshly, while the advantages of the old days are seen in an all too dazzling radiance.

“The third trait of the character of the aged man is *universality*. He is far-sighted, and while he no longer perceives the minor particulars close at hand, he sees more plainly than ever what is large and distant. Wisdom comes to him; the lucid survey of details, the grasp of matters

Old Age

from general standpoints. The judgment is clearer, because it is not restricted by the power of the emotions and passions; matters are dealt with in a more cautious and deliberate manner. A certain gentleness of mood is characteristic, and even in a brutal character harshness melts and gives way to a milder temper, as the power of external action diminishes, and the bold and sensual self-assertion. . . . A cheerful mood marks the last stage of life. Vehemence is abated; the tension of conflict is slackened, and the peace of victory achieved."

This characterization dates from 120 years ago. As a general description it is to this day unequalled, so that it finds a place in the great manual of *Normalen und Pathologischen Physiologie* published in Berlin in 1926; in the chapter on old age and death contributed by S. Hirsch to the 17th volume. A second description of more recent date will be found in the *Handwörterbuch der Medizinischen Psychologie* (Leipzig, Thieme, 1930), contributed by the psychiatrist H. W. Gruhle:

"The first indication of involution is the earlier incidence of fatigue. As the body finds athletic exercises more difficult, so the intellect loses more readily its power of concentration. Intuitions are less abundant, and initiative fails. New concepts of value are assimilated with difficulty; the ageing man becomes more rigid. The habitual trains of thought, the methods followed a thousand times, are still pursued; but only these. Even the disposition is affected. People are fond of speaking of the enlightened wisdom of the aged man, and it is true that there are venerable individuals in whom we find the tranquillity of the sage, of him who has experienced all things, understands all things, and often pardons all things. But in many old men this apparent enlightenment is nothing but indolence, debility and callousness. And in many other cases the ageing man grows morose, irritable and discontented with his environment and the world. Many a shrewd old man recognizes that he is no longer taken quite seriously by his own children, that it

The Psychic Process of Ageing

is only in the outer world that his word still has some authority; that in political parties, public assemblies and committee meetings, people tend to edge him from active participation into decorative and honorary positions, and leave him out in the cold. His new rigidity of temper can no longer keep time with the fainter stimuli and vibrations of the latest mode. The consciousness of the ingratitude of those surrounding him, a half-conscious admission that he can no longer keep pace with them, makes him bitter and autocratic. The gloomy mood and irritable temper of the father is often a grievous burden to the whole family.

“Further, the old man may be intellectually intolerant. He is not only less receptive of novelty; he does not welcome any innovation in his environment. Why?—he always asks. Why should everything be done differently now? Hitherto things were always done so and so. One is reminded of Rohmer’s aphorism: The boy inclines to radicalism, the young man to liberalism, the middle-aged man to conservatism, the old man to absolutism. The conflict between fathers and sons is thus a perennial phenomenon, depending not on cultural but on biological factors. But in other respects also the ageing man may easily prove obnoxious to his environment, and especially to his family. He no longer thinks so much of his outward appearance; he begins, as he says, to esteem only the content; no longer the form. So, gradually, he begins to neglect those forms which alone make a common existence tolerable in the close intimacy of a cultivated family, and yet he himself demands the recognition and consideration exacted by his increasing craving for authority. The façade is kept up only for the outer world; at home he lets himself go. As new interests lose their appeal for him his appetite for sensual enjoyment often increases. In this phase of life many ageing men become more addicted to alcohol. It is always asserted that even the sexual instinct flares up once more in these years of involution. It is probably more in accordance with the facts to say that while this is not the rule, such a revival does occur in many individuals.

Old Age

“Even in the sphere of learning the peculiarity of the ageing scholar is apparent. He grows intolerant. He believes that he can solve all manner of problems, basing his decision on his often far-fetched experience; although they cannot really be solved on the basis of experience at all. So, as old age creeps on, he oversteps the limits of his speciality; as his power of self-criticism rapidly decreases, he gives apodictic utterance to his opinions in respect of matters of which he has no understanding.”

It will be obvious, from the above quotation, that Gruhle's description refers mainly to the second phase, or senility; it was doubtless intended as a background for the presentation of pathological phenomena. Gruhle gives us a scientific version of the customary opinion as regards the drawbacks of old age. For him “human existence, after passing through the portal of old age, is a pathological process with a development *ad pejus*” (W. Betzendahl). He sees before all else the negative characteristics of this stage of life. In the description of Burdach, who, in accordance with the spirit of his period, was greatly addicted to philosophical digressions, we recognize the first phase. At the same time, it must be noted that in the days of the aged Goethe, when Burdach was writing, old age was regarded very differently than in Gruhle's day. Burdach laid particular stress on the “transformation of the external environment. . . . The ageing personality is decisively conditioned by the changes affecting his efficiency and his (inner) environment. The altered efficiency, in relation to diminished receptivity, reveals itself, in healthy old men, in an increased vitality of the inner world” (I. H. Schultze). Burdach believes that a structural change can be observed in the psyche of the ageing man; he values old age according to its peculiar inner law, which allots to this stage of life its own intrinsic claim to esteem. This is perhaps most apparent in the memory. It does not simply become worse; it becomes more fastidious. What is actually essential comes to the fore; what is unimportant is not retained, is indeed barely

The Psychic Process of Ageing

remarked. In the thought of the old man the substance of what is perceived fades from view, while the conceptual acquires greater significance. Thought becomes less ample, but more economical. The world is seen with a different vision; it appears poorer in colour and tone, but for that very reason clearer and more transparent. The difference may be thus defined: Gruhle brings the psychic phenomena of age more or less into correlation with the biological curve of life. And this correlation does often exist. At the same time, we must not overlook the fact that in many persons there is a discrepancy between their physical appearance, or their years, and their intellectual deportment. The painter Delacroix (1799-1863) wrote of this discrepancy: "This singular lack of accordance between the spiritual strength which age brings with it and the enfeeblement of the body which is also the consequence of age always strikes me, and seems to me a contradiction in the decrees of Nature." And Montesquieu has noted the same contradiction: "Unhappy state of man! The spirit has barely reached the point of maturity when the body begins to decline."

The tragedy which makes its appearance when the declining curve of physical performance is traversed by the still rising curve of intellectual maturity could not be more strikingly described.

There is, as a matter of fact, a series of functions and faculties whose upward tendency follows a course opposed to the downward biological trend. Obviously this series includes such psychically conditioned performances as are relatively independent of the physical capacities, and which require time, or practice, or repetition, or experience, or a particular mode of approach, for their full development.

Again, we must not overlook the remarkable psychological fact that in certain individuals their peculiar charm, and even the power and beauty of their spiritual personality, often become manifest only during illness, and are lost when the patient is restored to bodily health (S. G. Carus). It

Old Age

may also be observed that the inner beauty of the soul increases during the riper period of life, while physical deterioration and illness make their appearance.

Quite recently E. Rothacker, following a similar line of thought, has pointed to the fact that age and ripeness are by no means synchronous processes in the case of intellectual workers; that the curves of age and of maturity cut across each other, and that in all the intellectual utterances of the old we must ascertain whether declining age or rising maturity is predominant.

THE PSYCHOLOGY OF OLD AGE

In the foregoing section the regular alterations of the psychic personality in age have been adumbrated. Can anything definite be said as to these changes? The normal psychology affords us little to go by. What we know of such changes is based, almost exclusively, as Kehrer has emphasized, on self-observation, or the general experience of persons interested in psychology—of poets, novelists, and philosophers. Such systematic observation, while it affords us isolated glimpses of considerable interest, and enables us to come to certain conclusions, does not take us very far; perhaps because this method of investigation, by means of laboratory experiments and complicated apparatus, does not bring us into living contact with the personality conceived as a whole.

The first experimental investigations into the psychology of individuals of different ages were undertaken at the instance of Sir Francis Galton (1822–1911), the founder of the science of eugenics. (Von Bracken has recently called attention to these inquiries, which date back to 1889). In the International Health Exhibition of 1884 he organized two anthropometric laboratories, in which visitors to the exhibition were subjected to anthropometric examination. Amongst other things, visual measurement and perception

The Psychology of Old Age

of verticality were tested. The measurements obtained were afterwards checked by Ruger and Stoessiger for changes due to age. Seven thousand cases, ranging from the age of 10 to the age of 80, were available for the purpose.

Now, von Bracken has rightly drawn attention to the fact that in visual estimates we have a performance which is only slightly related to the sensory function, and which therefore depends all the more on the intellectual faculties. And what course does the curve of this faculty follow in relation to age? Visual measurement was tested by dividing a given length into halves and thirds. The accuracy of the estimates increased until shortly after the 20th year, and then, on the average, continued at about the same level. In respect of bisecting the line a decided deterioration appeared only in the seventies, but the ability to trisect the line accurately was unaffected.

The psychologists have endeavoured, in the case of persons of different ages, to study not only the intellectual efficiency, but also the internal modifications of the psyche. E. Weiss made various psychological investigations with the aid of some 500 porters of the German State Railway. For this purpose he applied the so-called time-table test, in which the shortest connexion between two stations has to be determined. On an average, the results obtained between the ages of 20 and 60 (older porters were not tested) were almost exactly equal. Of course, in this case professional experience played an important part. "But can it be neglected," von Bracken very justly asks, "when one is testing intellectual efficiency?"

In recent years this problem has been investigated mainly by American industrial psychologists. Walter R. Miles, in the course of his investigations, employed a whole series of tests of physical and psychical proficiency. In his intelligence tests he made use of the so-called Otis series of tests. This comprises sixty different little tasks and problems, for whose solution a quarter of an hour is allowed. Over and over again, for dozens of times, the examinee has to tackle

Old Age

a new task, sometimes dealing with figures, and sometimes interpreting the meaning of difficult sentences, while sometimes he is confronted with meaningless material. The result of the tests was as follows: The average quality of the performances remained, into the fourth decade, at the level of the beginning of the third; it then steadily declined. But when the answers had not to be given within a given time, the results were better in the case of the older examinees.

Many objections may be adduced against such intelligence-tests. E. Weiss has justly remarked that such a series of tests does not constitute an adequate measure of intellectual efficiency in the older age-groups. The performance of a man of sixty who works through such a series of tests is really quite unlike that of a man of twenty who to all outward appearance does exactly the same thing. At the same time, of course, age is not the only factor which accounts for the different results obtained. Even inside the individual age-groups there is considerable disparity of efficiency. W. R. Miles himself sums up the results of his intelligence tests as follows: Of fundamental significance in a biological explanation of psychological senescence is the physiological decline, but equally unmistakable is the wide individual disparity, where efficiency and intellectual capacities manifestly decline later than is compatible with the chronological age. This overlapping of one age-group by another is of frequent occurrence. Another fact has been established by Miles: The deeper the inquiry, in such experimental work, into the state of the subject's experience and judgment, the more independent does this prove to be of physiological decline, even when the whole of his previous life is included in the inquiry.

Miles also endeavoured to give some account of the changes of the inner world of the psyche by age-tests applied, by means of his kinophantoscope, to 1800 men and women between 25 and 90 years of age. This apparatus projects upon a white screen blots of ink, which move about ;

The Psychology of Old Age

the person under test endeavours to read something into these black shadows. The interpretations of the shadows vary, but certain interpretations frequently recur. Miles placed each person to be examined before the white screen and estimated their observations: first, by the number of different interpretations, and secondly, by the frequency of the change of interpretation. He arrived at the surprising result, that in both respects age made no difference.

Yet that the imagination does undergo some sort of change in the course of life was shown by Wollrab, by his experiments in interpretation of shape, with artificial compositions of shapes. He found that persons of different ages saw and interpreted the compositions differently. In youth the comparisons were more lively and voluptuous than in later years. This points to a qualitative change; a phenomenon already recognized by Schopenhauer, who described it as follows: "Further, one may compare life with an embroidered cloth, of which it is vouchsafed to every one to see the right side during the first half of his time, but the reverse side during the second half; the latter is not so handsome, but more instructive; because it enables him to perceive the connexions of the threads."

An eminent man who had a very voluptuous youth behind him once informed me that the world no longer appeared to him like a brightly-coloured painting, but like an engraving. "Every man," wrote the septuagenarian Goethe, "is an Adam; for he is sooner or later driven out of the Paradise of the warm emotions."

Several authors have inquired of librarians as to what kind of literature is especially preferred by readers of different ages. Others have submitted questionnaires to listeners to the radio broadcasts, in order to determine the popularity of various broadcasts. Perhaps the most noteworthy result thus obtained is the fact that with increasing age the interests of the two sexes become increasingly similar.

How does a man become conscious that he is growing old? Here again the attempt has been made to obtain information with the help of statistics.

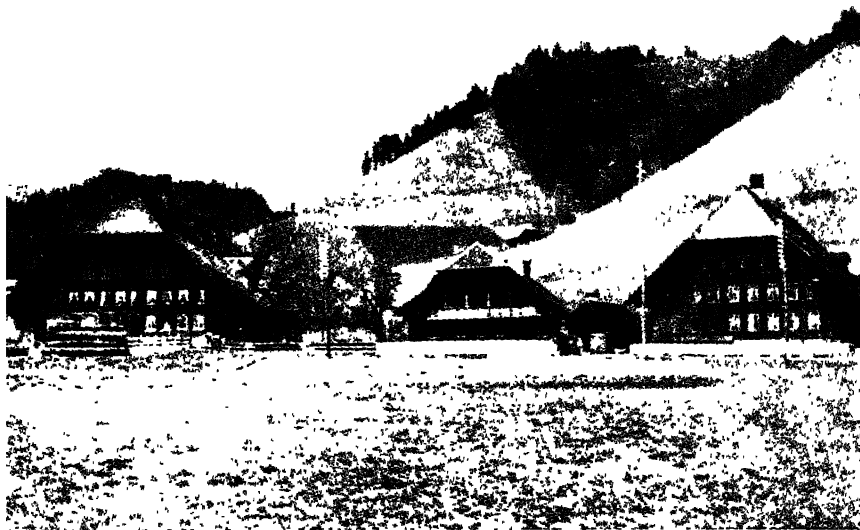
Old Age

Giese published a questionnaire in fifty German periodicals: "What first made you realize that you had grown old?" From the 350 answers obtained it appears that the first feeling of old age may occur at very different ages. The answers as to the first occurrence of the sense of having grown old range from 18 to 82 years! The average age at which the advent of old age is realized is the 49th year.

The bodily signs of age are twice as frequent as the psychical, and in order of decreasing frequency they affect the following organs and functions: Agility, nervous system (including defects of memory and insomnia), sensory organs, skin, resistance to fatigue, sexual functions, circulation, metabolism, digestion, kidneys, respiration.

On the other hand, M. Bürger, as we have already noted, held that the individual organs age simultaneously and harmoniously, inasmuch as each organ obeys the same law of senescence, which holds good for the whole organism.

In healthy human beings the advent of old age is generally unexpected and undesired. Who does not experience a secret satisfaction at the thought that he looks ten years younger than his age? The changed appearance of his contemporaries gives him cause for secret satisfaction, if he does not examine himself too critically. Suddenly the youthful septuagenarian realizes that he needs a longer time for his accustomed walk, or he hears someone refer to him as an old man, or in a tram or omnibus an obliging young woman offers him her seat. Sooner or later the signs of age make their appearance; but in individuals of great vitality their advent is often belated; as in the case of Victor Hugo, who in his 89th year could say to his physician: "Doctor, Nature never gave me any warning. . . ." Here we are reminded of the story of "The Man of Fifty," which Goethe wrote in 1826, when he was well over seventy. In this story Goethe presents a father and his son contending as suitors to the same girl; at the same time he describes in the subtlest manner how the father becomes conscious of his age, and abandons the contest.



I

The "Lichtgut," near Signau, Canton Bern

The Wüthrich house on the right, the Fahrni house on the left. In the middle the Wüthrich "Stockli." (Photograph by Robert Marti-Wehren, Bern.) See page 154

The Psychology of Old Age

But psychotechnical investigations alone, however interesting the individual results which they may yield, cannot provide us with any total picture of the ageing personality. They hardly take us any farther than the wisdom of the ancients, as expressed in the Greek proverb: "In youth deeds, in middle life, counsel, in age, prayer;" or in the labels, "Cleverness, sagacity, wisdom," which Immanuel Kant attached to three ages of man—the 20th, 40th and 60th years. Again, the plotting of a vital graph which represents the psychic processes, like the graph which seeks to illustrate the constitutional doctrine of the purely physical changes, has something arbitrary about it; and it does not yield any results of universal validity. The influence of the constitution in the changes produced by age in the human personality has as yet been hardly investigated. Doubtless under the conviction that isolated observations do not really bring us into intimate contact with the psychic content of the aged individual, but that a better mode of approach is through the comprehension and description of the entire human being, in all his psychic impulses and conditions, an attempt was made to trace the processes of senescence in the poetical, artistic, and scientific works of intellectually creative personalities. Such an examination of the creative work of ripe old age ought to give us a profounder understanding of the nature of old age. It was hoped that in this way it would be possible to achieve a comprehension of the psychology of the composite aged human being, as represented by the sum of its different aptitudes and dispositions. What Goethe says in his preface to the *Farbenlehre* holds good in this connexion also: "In vain do we endeavour to describe the character of a human being; whereas one assembles his actions and his achievements, and we have before us a portrait of his character."

Rothacker, the philosopher and psychologist, who has already been mentioned, has said, not without reason: "He who knows what scientific psycho-analysis does not indeed always accomplish, but what it can accomplish—how much

Old Age

the obscurer achievements of the intellect, regarded as human documents, can reveal to the trained reader—must admit that the methodical analysis and comparison of some hundreds of ‘works’ represent, in reality, a body of material which can well hold its own, from the purely methodical standpoint, beside the physiological examination of the organic functions.”

On the other hand, the effect which works of art produce on the beholder in the different stages of life is extremely revealing. Just as a painter, an agriculturalist, or an army officer will see the same landscape quite differently—one perceiving its artistic qualities, one seeing its agricultural value, and one divining its tactical possibilities—so healthy persons of the typical phases of life have their characteristic patterns of experience (J. H. Schultz). Goethe, at the age of 73, wrote to Karl Friedrich Zelter: “If I now read Homer he wears another aspect than that of ten years ago; if one lived to be three hundred years old he would always be striking one differently.” And the painter Delacroix wrote in his diary: “Titian—there is a man who is created to be appreciated by those who are growing old; I admit that I did not in the least appreciate him in the days when I greatly admired Michelangelo and Lord Byron. It is not by what I know of him that he touches me, nor by a great understanding of the subject, but by his simplicity and absence of affectation.”

TYPOLGY OF THE STAGES OF LIFE

HERE we might take into consideration the investigations of Charlotte Bühler, whose findings are recorded in her work on *Der menschliche Lebenslauf als psychologisches Problem*. The Viennese psychologist has compiled statistics of production, based on the analysis of distinguished careers, which throw some light on the quantitative distribution of perform-

Typology of the Stages of Life

ance during the curve of life (cf. Fig. 1). By so doing she devised a method of apprehending and representing the life-work of human beings. This method provides a quantitative and to some extent a qualitative survey of the varying output of men and women during the course of their lives.

On the basis of these statistics Charlotte Bühler was able

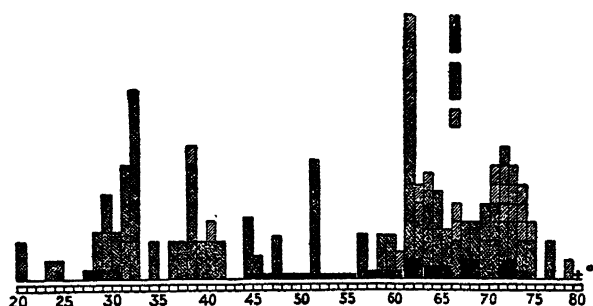


FIG. 2

THE SO-CALLED PRODUCTIVE PHASES IN THE CAREER OF THE PHILOSOPHER
IMMANUEL KANT (1724-1904).

From Charlotte Bühler, *Der menschliche Lebenslauf als psychologisches Problem*. (By permission of the publisher, S. Hirzel, Leipzig.)

Note the conspicuous creative activity in old age. Of Kant's principal works many were produced in his old age. From the standpoint of the productive phases, Kant's working career would approximate to "distribution-type 3."

to distinguish four main patterns of output-distribution (see Fig. 3); but here it must be recollected that the career as a whole is taken into account, without considering whether or not an advanced age was attained. These four types can be characterized by roughly schematic graphs. In Type I the peak of the quantitative output lies at the beginning of life; from the culminating point of achievement the curve then gradually sinks towards the end. The nearest to this type is the second, in which the culmination lies in the middle of life. These two types have one thing in common—the output curve follows approximately the biological curve. The third type is the antithesis of the first; for in this the output gradually rises during the course of life, reaching its highest point relatively late in the second half of life, and thence-

Old Age

forth falling steeply and continuously toward the end. Finally, a fourth type is characterized by the fact that performance has no obvious relation to the biological phases of life, but runs through the whole of life as a constant. The third and fourth types have this in common, that performance appears to be comparatively independent of the vitality of the individual; that is, it does not follow the biological curve. In respect of the third type one gains the impression that activity develops increasingly, until this

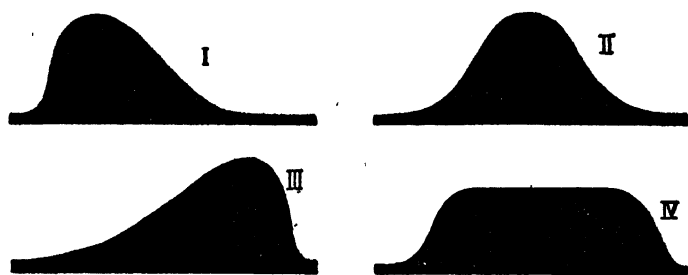


FIG. 3

TYPES OF DISTRIBUTION OF QUANTITATIVE OUTPUT.

After Charlotte Bühler, *Der menschliche Lebenslauf als psychologisches Problem*. (By permission of the publisher, S. Hirzel, Leipzig.)

On the basis of these output statistics we can distinguish four main types of distribution. These four types are characterized by the above schematic curves. The peak of quantitative efficiency may occur relatively early in life: as in Type I. In Type II the culmination lies in the middle of life. Type III shows a gradual rise of performance during the greater part of life, the peak being reached relatively late in the second half of life. Type IV shows performance as a constant, running through the whole of life.

Types I and II show an output-curve which follows approximately the biological curve. Types III and IV have one thing in common; performance is relatively independent of the vitality of the individual; it does not follow the biological curve.

development is brought to a close by excessive biological weakening of the general constitution, by illness, or by senile debility.

Now, the productive capacity of a human being is closely bound up with his psychical personality, and it may be stated, quite generally, in amplification and illustration of Charlotte Bühler's typology, that the continuation of the psychical development during the course of life is sub-

Typology of the Stages of Life

ject to great variations. There are people who cease to develop comparatively early in life, and these attain to a certain rigidity, when further evolution, novel production, or vital elaboration of new and unfamiliar material is no longer possible. At the same time, there are people who retain a certain plasticity, who never come to a full stop, are never, so to speak, completed. Such people are restlessly urged onwards; they are always changing, and sometimes achieve performances of amplitude and significance. Humanity has to thank such men for extraordinary achievements (C. G. Carus, 1789-1869).

A consideration of this type of efficiency reminds one of the following observation of Schopenhauer: "I have observed that the character of almost every man seems to be pre-eminently adapted to *one* stage of life; so that in this stage he appears to the greatest advantage. Some are lovable youths, and that is all; others are active and energetic men, but age robs them of all worth; many appear most advantageously in old age, when they are more benevolent, because more experienced and more tranquil. . . . The reason of this must be that the character itself has something youthful, or adult, or elderly about it, with which quality the current stage of life harmonizes, or opposes as a corrective."

An observation in Houston Stewart Chamberlain's biography of Goethe seems to confirm what Schopenhauer has remarked: "If Schiller's life had been longer he would have given us further works, but it is unlikely that his personality would have attained to any greater stature; whereas if Goethe—like Schiller—had been cut off at the age of 46, the Goethe whom we now regard with wondering admiration would have remained indiscernible and therefore unknown. To have reached an advanced age in a state of comparative vigour was an essential factor of Goethe's personality."

Here, too, we may quote a passage from a story by Arthur Schnitzler, which deals with a special accentuation

Old Age

of age in different personalities. In his story of "Frau Beate and her son" Schnitzler makes one of his characters say: "I, of course, was born old. You don't know what that means? I'll try to explain. You see, we who are born old, in the course of our lives, let fall, as it were, one mask after another, until, perhaps when we are eighty, but in many cases, of course, rather earlier, we show the world about us our real face. The others, the people who were born young, remain always young; children, in fact; so that they have to mask their faces, using one mask after another, if they don't want to be too conspicuous among other people. Or the mask somehow slips over their features, and they themselves don't know they are wearing a mask; they have only a queer, obscure feeling that something or other must be wrong in the calendar of their lives . . . because they still feel young."

While Charlotte Bühler deals mainly with the quantitative performance—though in so doing she gives us valuable glimpses of the qualitative output—A. E. Brinckmann, a writer on the history of art, endeavours, by the analysis of the later works of great masters, to trace the qualitative changes in their later achievements.

In a subsequent chapter on the output of age we shall go more fully into the matter of the achievements of the later years of life. Brinckmann asks the question: Is the broader brushwork, the simplification, the larger and freer treatment of form, the greater sincerity, together with certain superficial appearances—is all this a phenomenon of age, or is it not rather a phenomenon of ripeness—that is, a finally achieved and happily experienced stage of maturity, skill, and wisdom, which has learnt, by the loftier intuition only now acquired, to distinguish the essential from the unessential, and so produces a deeper impression on the ripe observer? Brinckmann, basing his remarks on his æsthetic observations, speaks of a phasic change, which occurs in the course of the creative life of the artist, between the antitheses, dynamic on the one hand, and on the other, introver-

Typology of the Stages of Life

sive; or, on the one hand, interest in externals, and on the other, withdrawal into oneself. This phasic change he describes as "an individual transformation of a psychophysiological nature within the life-format of the æsthetic man." Brinckmann, in his characterization of the phasic transformation which he has noted, avails himself of Jung's definitions of the typological psychic attitude. He sees a change from the extraverted to the introverted type. It is, of course, possible that this change will be still further amplified from the psychological point of view, and also more precisely conceived.

Lastly, the attention should be drawn to a factor which exerts an exceptionally powerful influence over the sense of life and the spiritual attitude of the human being; the change in the subjective estimation of time. Schopenhauer has dealt with this phenomenon in the philosophical sense.¹

"Consequently," he writes, "the time of our life has an accelerated motion, like that of a ball rolling down a slope; and as, on a rotating disc, every point revolves more rapidly in the ratio of its distance from the centre, so time passes more and more swiftly in proportion to its remoteness from the beginning of life. One may therefore assume that in the immediate estimation of our minds the length of a year is in inverse proportion to the ratio of the same to our age; for example, if a year constitutes one fifth of our age it seems to us ten times as long as if it were only a fiftieth. This difference in the velocity of time has the most decisive influence on the whole character of our existence in every period of life."

Quite recently the French biologist Lecomte de Noüy has concerned himself with the problem of age and the changing estimation of time. He asked himself whether, in the subjectively rapid passage of time in advanced age, we are dealing with a physical reality or a psychological experience. In the World War of 1914-18 he had the opportunity of studying this problem at the instigation of

¹ In his study, *Vom Unterschied der Lebensalter*.

Old Age

Carrel. He set himself the problem of discovering a mathematical formula applicable to the process of cicatrization. Carrel had arrived at the conviction that in the healing process of a wound which was maintained under properly sterile conditions, such as would guard it against inflammation, a regular mathematical function was involved. By exact observation and planimetric measurement of healing wounds at fixed intervals of time, Lecomte de Noüy succeeded in working out a 'healing index.' He now found that his 'healing index' varied in accordance with the age of the patient, and, indeed, that this variation followed a definite law. He was thus able, by means of his healing index, to calculate the age of the wounded person. It appeared, for example, that if in the case of a child of ten years a wound with a surface of three square inches healed in twenty days, in a man of twenty years it healed in 31 days, in a man of forty in 55 days, in a man of fifty in 87 days, and in a man of sixty in about 100 days.

Thus, this physiological process did not proceed at the same rate in the child, the young man, the middle-aged man and the old man. For the physiological work-unit of wound-healing the man of fifty needs about four times as much time as the child of ten. Lecomte de Noüy therefore argues: 'It is as though for a man of fifty sidereal time passed four times as quickly as for a child of ten. From the internal standpoint of the ego much more happens to a child in one sidereal year than to an adult or an old man. To the child the year seems to pass much more slowly, and the numerical values at which we have arrived enable us to calculate not merely how far our physiological activity is diminished, but also the tempo in which sidereal time is accelerated for us. . . . Old and young persons living in the same room are in reality inhabiting separate universes, in which the value of time is fundamentally different. The difference of these rhythms enables us to understand why actual contact is impossible. It does not appear that either the pedagogues or the psychologists have clearly realized the

Typology of the Stages of Life

great importance of the unequal estimation of time at different periods of life."

We cannot here enter into a discussion of the problem of time. But I think we shall find it very difficult to accept Lecomte de Noüy's conclusions. That sidereal time varies, ontologically speaking, in one and the same individual, is barely conceivable. Only the subjective estimation of time can change; but not the sidereal time itself. It seems to me, however, that the significance of the time-valuation applies to the whole psychic content.

Here is a possible explanation of the subjective acceleration of the passage of time: in old age the intellect becomes more abstract in character, and perceives greater and greater similarities in the manifoldness of impressions and experiences. For the young man, for example, different representative events are very different experiences; for the old man they are all parts of the same spectacle. But as our experiential conception of the manifold contracts, so does our consciousness of time.

The problem of the passage of time and, in particular, the influence of the estimation of time on the whole of the emotional life, was discussed by the Baltic naturalist, Karl Ernst von Baer (1792-1876). In an essay entitled: "What is the correct conception of living Nature, and how is this conception to be applied to entomology?" he tried to realize what would be the 'life-feeling' of two hypothetical human beings—one very short-lived and one very long-lived; presupposing in the case of the short-lived person a corresponding acceleration of all sensory perceptions, and in that of the long-lived person a corresponding retardation. According to von Baer, this difference in the estimation of time would result in a totally different view of the cosmos, and also a different 'life-feeling.'

But it is not only the experience of time—that is, the subjective valuation of time—which changes in accordance with age, but also the retrospective view of the past, and the outlook upon the future. "Life," wrote Adalbert

Old Age

Stifter (1805–68), “is immeasurably long so long as one is young. One always thinks that one still has abundance of time before one, and that one has travelled only quite a little way. Consequently, one puts things off, sets them aside, in order to deal with them later. But when one seeks to deal with them it is too late, and one realizes that one is old. Consequently, life is an illimitable expanse when one looks forward to it, and barely two spans in length when at the end one looks back upon it. . . .” These words of Stifter’s characterize the changing awareness of the past and the future.

THE SENSE OF LIFE IN OLD AGE

THE sum total, the balance-sheet of life up to the passing moment is closely associated with the retrospective view of the past. The fuller a life has been, the clearer the view of the ageing man, even to the ultimate depths of life. Memory can become a precious possession and an operative force. At the same time, retrospection may have consequences of a very different nature; the ageing man, summoning up his remaining energies, and exploiting all possibilities, may hastily endeavour to make up for lost time, and to do what he has hitherto failed to accomplish; to retrieve the neglected opportunities of enjoyment, to fulfil the unfulfilled obligations, to achieve the unachieved (Ch. Bühler). In such a crisis of accounting, in such an eleventh-hour panic, the *Démon de midi* may work its will, as Paul Bourget described it, or as Dr. Repond-Malevoz has recently analysed it. And if we are to believe the French dramatist Brieux (1858–1932), an erotic crisis of this kind may occur with the onset of age: “It is the time of blossoming, the finest moment. The women are right; it is the man of fifty who receives the most ravishing smiles. This is the age when Don Juan received the most tempting invitations,

The Sense of Life in Old Age

and the most numerous. It would seem that when the sacred fire is about to expire upon the altar the priestesses, in obedience to instinct, come forward to pay it homage, seeking to rekindle it."

But besides retrospection, the glance into the future, with the conception of fresh possibilities, plays its part in conditioning the 'life-feeling' of the elderly man. The will to live can subsist only if it is supported by such conceptions. They render a man capable of enduring the adversities of life. An undefeated sense of life, an unbroken self-esteem, is hardly conceivable without hope.

The more vital the sense of the future, the more dynamic the sense of life. Consciousness of the future has its own peculiar formative power for every stage of life. By the consciousness of the future we mean that knowledge of one's own future that accompanies each of us. It is that expectation of what the future will bring, more or less definite in content; the comprehension of what is to come, resulting from a sensitive study of our consciousness of the future. This consciousness of the future relates, in the first place, to the immediately imminent; in the second place, to the remote future, the future distantly perceived. We recognize the fact that the cosmical time-structure to which all inhabitants of the earth are subject, the alternation of day and night, the quadruple rhythm of the seasons, represents a first division of objective as well as of experienced time. The cosmical time-configuration coerces the vital functions and the processes which preserve and create life into a sort of instalment system. We "live from day to day." Every moment of time is attached to an interval of time, has seen before it a terminal point, a contour, whose crossing leads to a new interval. Therefore the human consciousness always finds before it a primary, compulsive time-structure which most importunately, though it is generally unperceived and imperceptible, determines, in the temporal sense, the intercalated processes of life. Like the diurnal rhythm, so the annual rhythm impresses more or less importunate

Old Age

time-configurations on the consciousness. Temporal systems are formed which strongly influence a man's consciousness of the future. One has always moments of time before one which affect the experience of the passing moment. When a time-configuration is experienced the consciousness of the future is stimulated; the experience is influenced and shaped beforehand by the time-structure surveyed as a whole. On the grounds of this changing consciousness of the future we understand why a healthy youth, with the world open before him, has a different sense of life from that of the aged man who sees his expectation of life under reprieve. "The relation," writes Wilhelm Dilthey, "which most profoundly and universally conditions the sense of existence . . . is that of life to death, for the limitation of our existence by death is always decisive for our understanding and our valuation of life." The power of death as the "supreme menace" gives this existence its peculiar character, and this power, and the individual's mode of reaction to this "menace," is, as Martin Heidegger observes, of the greatest significance in respect of the sense of life.

In old age we find that the awareness of the future, and with it the sense of life, undergoes all kinds of changes. It may be directed forwards, in undiminished hope, and assurance of new experiences; we are reminded of Titian, who in his hundredth year confessed that now at last he was beginning to understand his craft. And Goethe said: "To grow old means to begin a new occupation." In others the consciousness of the future is projected upon their offspring. A man's child, grandchild, great-grandchild are so many guarantees of the life of the family, after his own death. Or faith in the 'beyond' compensates him for the all but unbearable hopelessness of a phase of life which Wilhelm von Humboldt (1767-1835) characterized as "the empty, merely useless period before the end"; and which Schopenhauer has pessimistically described: "For in advanced old age every day lived through arouses a sensation not unrelated to that which a criminal led to the scaffold feels at every

The Sense of Life in Old Age

step." On the other hand, the retrospective survey of a full past may replace the consciousness of the future, as the aged Cosima Wagner admitted on the occasion of a visit to Tribschen: "Now, in old age, I glance at the picture of my life on earth, and now my past has for me the same magical attraction which then my future had for me." The sense of life, at the close of the earthly pilgrimage, is often nourished by memories of youth and the home of one's childhood. Or the old man derives a special pleasure from meditating upon the ideas and achievements of his ancestors. In old age there is a nostalgia for the landscape of infancy, the place of origin.

But if there is no such forward orientation, or if no compensation for it exists, the concrete structure of time that serves as a frame for the anticipation of life collapses, and amidst the débris of this structural decay there remains, as the sole temporal fabric, the banal division of time into days, and the discharge of the animal functions. The influence of this collapse of the time-configuration is observable not only in old age. The forward orientation can be destroyed artificially by external circumstances. The mood of certain old people, in which the influence of the destruction of the time-configuration is especially conspicuous, always reminds me, of the spiritual dejection which I have observed in prisoners of war, and which I have described as the 'barbed-wire malady.'

Parallel with the altered consciousness of the future is the change in the environment, in the sense of finality (J. H. Schultz), which Michelangelo expressed in verse:

"The years of my earthly course have reached their goal,
As arrows that have flown and pierced the mark;
Now must the failing fire at length subside."

Without a clear and thorough consideration of the problem of finality any profound understanding of the psychological state of the ageing man is impossible. "The fundamental fact," says J. H. Schultz, "that the ageing man is anchored, as it were, by his past life, in its decisive

Old Age

and basic conditions, that a permissible and ineluctable career was necessary, and prescribed, not essentially by his abilities, but by duty, responsibility, and devotion to his family, and his work, and the community, that he must have the courage and the spirit of self-sacrifice to fulfil his destiny, appointed by himself and others, to the end; this last and ineluctable obligation means for many a loss of liberty attended by anguish, against which the man defends himself all the more helplessly if he fails to understand the profound and enriching meaning of the obligation; all the more, if he seeks, by self-deception or repression, to deny the fact itself, or to invalidate it."

To him who has not solved the problem of finality, the second half of life must appear simply as a period of exhaustion. "All that is then still experienced, all that still happens, is now an obvious decline, a negatively experienced, unwillingly suffered deprivation, without the least positive aspect" (Ch. Bühler). Finality need not make for mere vegetation; it leads a man to value all the more highly the time yet vouchsafed, and to control, and make productive, the peculiar mental structure of advancing age. Age can reveal new and positive tasks. In such an ending of life one may speak of self-fulfilment. This fulfilment may be contrasted with the collapse or surrender where only the gifts of nature, coming and going with the physical ebb and flow, are taken into account.

II

THE DURATION OF LIFE

THE CHRONOLOGICAL AND PHYSIOLOGICAL STAGES OF LIFE

WE have had exact knowledge of the duration of human life only since the registration of births and deaths has been practised. In most European countries we have had official registers of the dates of birth and death only since the seventeenth century. Reliable data from earlier periods relate only to individual persons of the higher ranks of life. As far as our present knowledge of the subject goes, the span of human life has not altered. By the span of life we mean the limits of longevity which cannot be exceeded under the most favourable conditions. One may put the span of life at about one hundred years. But only a few human beings attain this vital frontier; the majority reach an age which lies two or three decades below the attainable limit. And this has doubtless been so in all ages. Every one knows the words of the Psalmist: "The days of our years are threescore years and ten, and if by reason of strength they be fourscore years yet is their strength labour and sorrow. . . ." These words come from an age when time was reckoned as we reckon it to-day; and they are still true to-day.

At the same time, all ages have known a belief in the existence of human beings of extraordinary longevity. The Jewish historian Flavius Josephus (A.D. 37-95) speaks of the great age of the Biblical patriarchs, of whom there is record in the Book of Genesis. He concludes that the great age of the patriarchs is a historical fact, and refers to similar Egyptian, Babylonian, Phœnician and Greek traditions, according to which the age of the earliest men was measured in thousands of years. The notion that men lived longer in prehistoric times appears to have been very widely held in the Middle Ages. The conception of diminishing longevity is perhaps connected with the belief in a Golden Age.

Old Age

The theologian Rudolf Smend (1851-1911) sought to explain the records of the longevity of the Biblical patriarchs by the suspicion that humanity was much older than one would surmise from the historical account transmitted by Genesis. This suspicion gave rise to a need to obtain some conception of the long duration of the prehistoric age, and its division into periods. The compass of the age had to be given by the mythical genealogy of the earliest men, and on this account the longevity of the earliest men was enormously exaggerated.

The science of palæontology, in so far as research has yielded relevant data, knows nothing of the longevity of prehistoric man. The number of skeletons found is relatively small, and the epitaphs or documents which would give us information regarding them are lacking. Thus, when bones are discovered one can only estimate the age of the individual to whom they belonged, and such estimates have merely a limited value. At the second International Paleontological Congress a French anthropologist, Henri V. Vallois, made certain statements regarding the longevity of prehistoric man. In the case of 187 skulls of prehistoric origin he believed that he had arrived at reliable estimates of the individual ages. In the determination of age he relied on the deterioration of the teeth by protracted use, and the closed or open state of the sutures of the skull. Now, neither of these criteria is entirely reliable. The abrasion of the teeth depends very largely on the character of the diet. On the other hand, we know that the ossification of the cranial sutures is subject to great variations. If complete ossification is observed in a skull, we know that the phase of youth was ended. Of the 187 individuals whose skulls were examined 20 were Neanderthals, 102 belonged to the Old Stone Age, and 65 to the Middle Stone Age. According to Vallois' estimates, of these 187 individuals only three had passed their fiftieth year. Vallois offers a biological explanation of the early demise of prehistoric man: in the mammalia death occurs when the power of

The Chronological and Physiological Stages of Life

procreation ceases and the physical energies fail. Neither among the animals nor among prehistoric men and women was there such a thing as senility, a state in which a man can exist only by virtue of mutual aid. Death follows when the individual is no longer capable of self-preservation, or of perpetuating the species. "Longevity," Vallois concludes, "as we know it to-day, is a secondary phenomenon, which is possible only under the very different conditions of our civilization. It is only thanks to these that modern man is able to attain to an advanced age. In prehistoric society there was no room for those whose vital powers were diminished."

The Berlin anthropologist Hans Weimert has expressed himself to much the same effect: "We have no skull which we can describe as senile in character; even the 'Old Man of La Chapelle' was not a patriarch! Relics of senile bones would not be imperishable; but we can assume that really old people were rare among the Neanderthalers; for most of them would have departed this life before they had reached old age."

At the same time, we have no precise data relating to the longevity of the primitive peoples of the present day. The opinions of explorers are contradictory. Some believe they have discovered great numbers of old people among primitive races; others tell us that only a few individuals reach the age of fifty. Critical anthropologists believe that this latter view is correct. The expectation of life in primitive races must be very low for old people, since longevity is determined mainly by social factors. On the other hand, it seems to have been established that the incidence of senility is no earlier in primitive man than in the white races.

A more valuable insight into the subject of the average duration of life and its variations in the course of the ages is provided by genealogical research. As regards the Middle Ages this is possible only in the case of certain classes of society, concerning which we have fairly reliable docu-

Old Age

mentary sources. Such a social group is furnished by the German Emperors. Max Kemmerich of Munich has attempted a systematic collation of the reliable data which we possess concerning the German rulers from Charlemagne to the present time. Even in antiquity men of this high rank received the attention of chroniclers and historians. Kemmerich came to the conclusion that since the early Middle Ages the duration of life in the imperial families shows a constant increase. His results are summarized in the following table:

Period	800-1300	1300-1450	1450-1600	1600-1780	Present Day
Average duration of life	31	36	37.1	37.7	39
60 years reached by	11%	15.4%	21%	17%	39%
70 years	6%	5.5%	9%	7%	20%
80 years	0%	0.1%	0%	1.2%	8.2%

Here, then, we see a progressive increase of the average duration of life. The figures relating to the average duration of life of the German Emperors approximate to the few average values which have been calculated in respect of certain urban communities. Caspar Neumann (1648-1715), Pastor of St. Elizabeth's Church in Breslau, drew up a statistical summary of the registers of births and deaths in that city for the years 1687-91. Neumann wanted to show that the position of the planets, and certain numbers, had no influence upon human mortality. And about this time the Royal Society in London moved a resolution to undertake accurate investigations into the longevity of human beings in various regions. Apparently through the intervention of Leibniz, Pastor Neumann was invited, by the secretary of the Royal Society, to communicate his tabulated statistics. The examination of the data collected was entrusted to the astronomer Edmund Halley (1656-1742).

The Chronological and Physiological Stages of Life

In 1693 Halley presented his subsequently famous treatise: "An estimate of the degrees of the Mortality of Mankind, drawn from curious Tables of the Births and Funerals of the City of Breslaw; with an attempt to ascertain the price of Annuities upon lives." Halley reckoned on an average life-time of 35.5 years; and he was the first person to draw up a so-called 'table of mortality.' An examination of some old statistical tables from the city of Geneva gave 26 years as the average expectation of life in the seventeenth century; in the eighteenth century it was 35 years.

For the whole of Switzerland it was found, according to the tables of mortality for 1876-80, that the newly-born male child had an expectation of reaching the age of 40.6 years, while the tables for 1932 already show a very considerable prolongation of life—namely, to 59.3 years. In the case of girl children the expectation of life has increased from 43.2 to 63.1 years. A good third of this increase in longevity was due to the great decrease in infant mortality. From the latest figures published by the Statistical Office of the German Reich it appears that the average life-duration of the German people is still on the up-grade. Newly-born male children, according to the mortality statistics of 1932-4, have an expectation of life of 59.86 years, which is 15 years more than in 1909-10; while girls have an expectation of 62.75 years, which is 14.4 years more than in 1909-10. For the United States of North America the following figures were found: in 1789 the average duration of life was 35.5 years; in 1850 it was 40 years; in 1900, 50 years; in 1920, 55 years; and in 1930 slightly over 60 years.

Equally striking are the changes in the so-called order of mortality. This tells us in how many years a definite number of persons born at the same time depart from this life. (Fig. 4.) The figures relating to Switzerland for the years 1876-80 show that 47 years later half the men had died, and 51 years later half the women. But the figures for the years 1929-32 show that the generation in question was

Old Age

reduced to half its strength only after 66 and 70 years respectively. In 1876 only 490 out of 1,000 persons reached their fiftieth birthday; in 1932 780 did so, or almost 60% more.

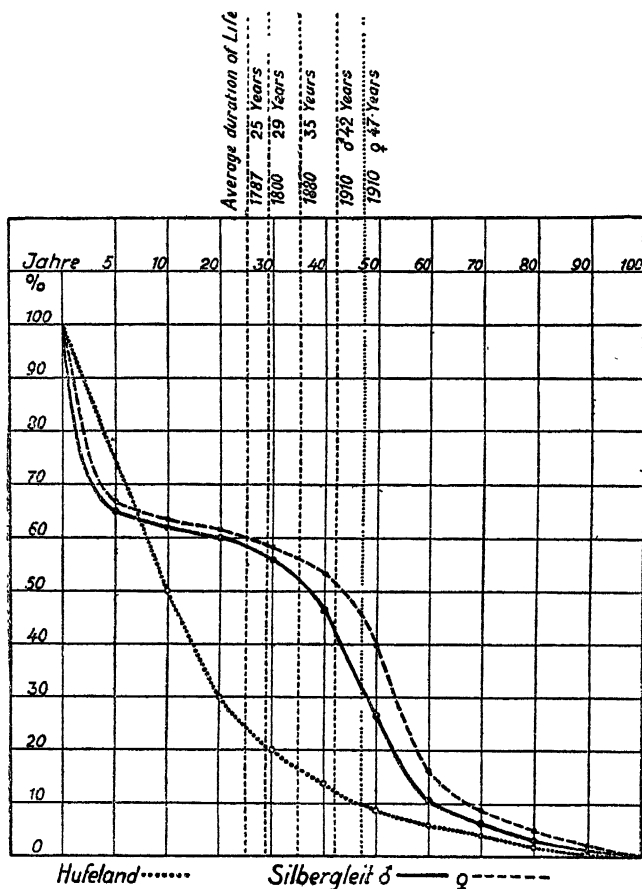


FIG. 4

RELATIVE LONGEVITY ACCORDING TO A. S. WARTHIN AND C. H. STRATZ.

Hufeland's table for 1787 is based on 'experience' and estimates. Silbergleit's data are based on official statistics, as given in the *Deutschen Statistischen Jahrbuch* for 1915. Both sets of data relate to North Germany. The increase of the average duration of life is evident. In 1787 it was 25 years, in 1800, 29 years, in 1880, 35 years, in 1910, 42 years for men and 47 years for women.

In other countries a similar picture presents itself. In England in the middle of the nineteenth century, one-fourth

The Chronological and Physiological Stages of Life

of all individuals born died before their 5th year. At the beginning of our century one-fourth died under the age of a little less than 40 years. While in the nineteenth century half the persons born died before reaching their 45th year, to-day half die before reaching their 65th year; in the nineteenth century three-fourths died before reaching their 70th year; now the figure is a little under 75 years.

What is the cause of this constant increase of the average duration of life? The well-known American insurance statistician Louis I. Dublin has come to the conclusion that the increase of the average duration of life is attributable almost entirely to diminished infant mortality and the successful campaign against certain diseases of infancy and childhood. In other words: The expectation of life of a man of fifty is to-day very much what it was in earlier periods. In the year 1840 the man of fifty could expect to live 20 years longer; in 1920, about 21 years. The triumphs of medical science have hitherto increased the expectation of life only during the first half of life. It remains to be seen how far they can increase it in persons who have entered upon the second half. Dublin has no doubt that they will do so eventually, and that we can then expect an average age of 75 years.

With the increase of the average duration of life there has naturally been a change in the constitution, the make-up, of the populations of Europe and North America. In the case of Germany, it has been calculated that in 1910 those individuals who were over 70 years of age constituted 2.7% of the population; by 1935 they constituted 3.1%. In 1925 persons of 65 years and over constituted 5.6% of the population. In order to represent in graphic form the internal changes in the population, the Swiss statistician Brüsche-weiler divided the population into three groups: i.e., the group of children up to 15 years of age; the group of parents, from 16 to 50 years of age; and the grandparents' group, of 51 years of age and upwards. During the last thirty years the age quota has remained fairly constant; but the children

Old Age

and grandparents have followed mutually different directions. Thirty years ago there were 31% of children to 18% of grandparents; to-day, for 25% of children we already have 21% of grandparents; and in thirty years' time there will be 32% of grandparents to 16% of children. Or, to-day, of a hundred persons, 23 are under 14 years of age and 12 over 60. As regards North America, Louis I. Dublin foresees that before long every tenth person will be in the aged category.

The changes in the composition of the population of the

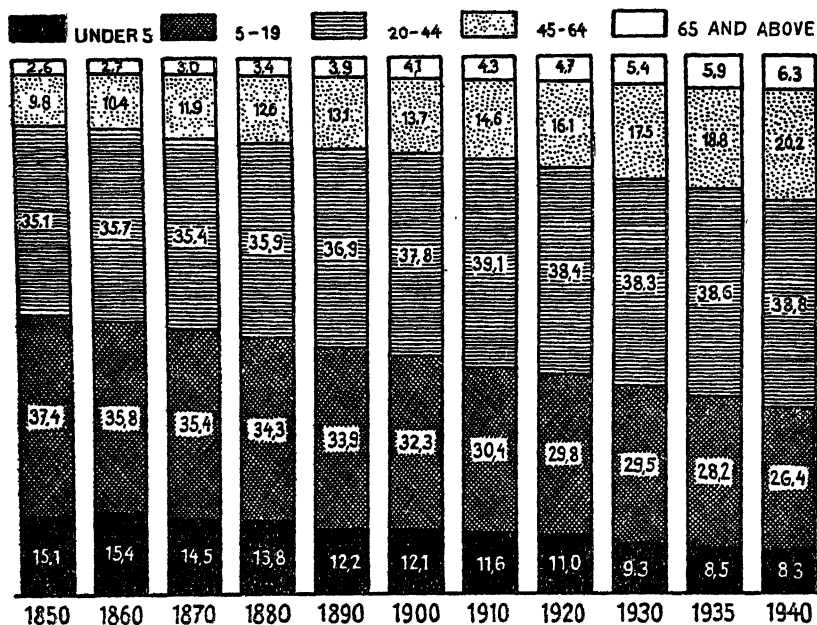


FIG. 5

CHANGES IN THE COMPOSITION OF THE POPULATION
OF THE UNITED STATES OF NORTH AMERICA FROM
1850 TO 1940.

From Louis I. Dublin's *Problems of Ageing*, ed.
E. V. Cowdry. Baltimore 1939.

United States are strikingly illustrated by the graphic representation in Fig. 5.

It all comes to this: the extreme span of life vouchsafed

The Chronological and Physiological Stages of Life

to mankind is 100 years. It is the lot of only a very few to attain this limit. But the number of those who approach it is undoubtedly increasing.

On the other hand, Irving Fisher, the political economist of Yale University, adduces a number of considerations which lead him to believe that no limit should be set to the increased expectation of life of future humanity. Not content with the naturally limited span of life, he seriously reckons with the possibility of a prolongation of life to the age of 150 and even 200 years—by eugenic measures, by the intensive application of hygienic precautions, by decisive discoveries in the sphere of prophylactics, and so forth. "I believe," he writes, "that the century limit is a bugbear which can be, and one day will be, thrust aside." Such arguments are attractive; so was the proposal to build the Tower of Babel. They do not take into account the inevitable deterioration, the natural wear and tear of the human organism.

However, Irving Fisher's hopes had their precursors in the legends of the ancient Greeks. The goddess of Dawn, Eos the immortal, the rosy-fingered, radiant in her imperishable youth, seduced the handsome prince, Tithonus, and chose him for her mate. She besought Zeus to bestow immortality upon him, but forgot to pray for eternal youth. Tithonus did indeed achieve long life, but he also became a helpless, withered, palsied greybeard, whereupon Eos exiled him from her bed, and imprisoned him, until Zeus had pity on him and changed him into a cicada.

The chronological duration of life may approach as closely as may be to the physiological term; it cannot outlast it. To approach the physiological term means to have run one's course. Longevity is thus a physiological function. "The more completeness a thing possesses, the more viable it is, the more life does it enjoy," says a modern biologist, H. Türck; and this applies to human beings also.

CONCERNING LONGEVITY

At what stage of human life ought we to speak of longevity? We have already explained our reasons for regarding one hundred years as the maximum age; that is, the age attained in the most exceptional cases. As a matter of fact, this age is reached by an infinitesimally small number of persons. We shall return in a later chapter to the problem of the centenarian. The very long-lived may come near to attaining their hundredth year, but it would seem that in all ages destiny and the human constitution have decreed that the maximum limit should be seldom attained, and that in the great majority the thread of life is severed twenty, thirty or forty years earlier. So even persons of seventy or eighty years may be called long-lived.

What is longevity? "Does it consist in a retardation of the ageing process, in a special durability of the vital organs, in an exceptionally efficient metabolism, which readily disposes of the waste products, in an unusual capacity for rejuvenating the tissues, or in extraordinary powers of resistance to lesions of all kinds, insusceptibility to poisons, etc.?" (R. Roessle). In his *Makrobiotik* W. Hufeland speaks of vitality as "the subtlest, most pervasive, invisible activity of Nature." The prolongation of life calls for such vitality, and the capacity for regeneration. We must add, of course, that there can really be no such thing as a prolongation of life; but rather, that life can be preserved only.

What then is needed in order to ensure long life? "The statement that in addition to luck in escaping mortal perils, and a favourable environment and fortunate circumstances, the possession of vigorous and long-lived parents and ancestors plays a part, and indeed the greatest part, is not new" (Roessle). Heredity is a very important factor of longevity. He who wishes to live long must in this sense be literally 'well-born.'

For early or late senescence, and its characteristic phenomena, heredity is held responsible. The early or late

Concerning Longevity

appearance of grey hairs, and prolonged 'youthfulness,' are obvious family characteristics. But heredity is also unmistakably responsible for factors of premature or pathological senescence, such as arteriosclerosis, as well as for physiological processes, such as the capacity of resistance, and slow deterioration of the organs.

Sir William Temple, the statesman and philosopher (1628-99), in his still readable essay on "Health and Long Life," also comes to the conclusion that the main thing is the stamina of our race and parentage, so that those who are fortunate in their birth have cause to rejoice. *Gaudeant bene noti!* But, as he says, to banish or control evil chance is beyond our power.

Roessle studied the family trees of two eminent and long-lived scientists: Bernhard Schulze of Jena, the founder of modern gynæcology, who died at the age of 92, and Ernst Haeckel, who reached his 86th year. Both, when they entered upon life, were admirably equipped in respect of stamina. As Roessle truly remarks: "They were very exceptional blossoms on the family tree, but without their families they were unimaginable." The inventor of the telephone, Graham Bell (1847-1922), devoted himself, in his old age, to the problem of longevity. He analysed the pedigree of the Hyde family, and found that of 184 persons whose parents reached the age of 80 years or more, the average duration of life was 52.7 years; on the other hand, in the case of 127 persons whose parents died under the age of 60, the average duration of life was 32.8 years.

Raymond Pearl, a well-known American biologist, was able to show that 45.8% of persons whose age at death exceeded 70 were born of marriages in which both husband and wife passed their seventieth year; 23.3% were born of parents of whom one reached the age of more than 70, and the other of more than 50 years; 17.5% were children of parents of whom one lived to be more than 70, while the other died under the age of 50. On the other hand, only 13.4% of the septuagenarians were born of two short-lived

Old Age

parents. These results were systematically checked, so that the element of chance was excluded. Pearl draws from these data the conclusion that heredity is one of the most important factors, if not the predominant cause of longevity.

Johannes Genschel established the fact that longevity is inherited by the analysis of a vast number of German genealogies. I-Chin Yuan came to the same conclusion after studying the genealogy of a Chinese family extending from 1365 to 1914.

Heredity, of course, is not the only factor determining longevity. All European and American statisticians point to the fact that sex is also of considerable importance. Pearl has analysed all the deaths occurring in the United States in the years 1923-7. There were 72,320 deaths of persons who had reached the age of 90 or over. This category comprised 29,317 men and 43,003 women. Women are indisputably longer-lived than men. Müller-Deham and other investigators have discussed the question, whether this is due to the greater hardiness and internal vitality of women. It is a question that is not easily answered. According to the experience of the insurance societies, the death-rate of women varies in different age-groups. It seems to be established that in middle life the death-rate of women is higher than that of men, and that it is only in the older groups that they enjoy a definite advantage over men in this respect. The higher death-rate of men in the older age-groups is doubtless conditioned by the after-effects of unhealthy occupations and an unwholesome way of life. Excessive indulgence in alcohol and tobacco is more frequent among men.

The influence of occupation on the death-rate has been decisively proved by certain English statistics. According to these statistics the death-rate is lowest among clergymen, farmers and schoolmasters; the middle position is occupied by blacksmiths, locksmiths, carpenters and physicians. Painters, glass-workers, workers employed in the iron and steel industries, and finally publicans, waiters and potters

The Centenarians

show the highest death-rates. Such statistics, however, must be accepted with critical reservations. A true comparison between the death-rates of different occupations could be drawn only if the representatives of the occupations compared were originally on an equal footing in the matter of health.

Pearl, in his statistical inquiry, noted the causes of death, and established the fact that more than 50% of the deaths were due to failure or disease of the circulatory system. This fully confirms the already quoted aphorism of Cazalis: "A man is as old as his arteries." The state of the circulatory system is a good indication of the constitutional and general health; all lesions and infections, all metabolic disorders, and excessive excretions, are quickly betrayed by their effect upon the blood-vessels. In them we can, as it were, read the destiny of a human life.

THE CENTENARIANS

FINALLY, the centenarians constitute a special group of long-lived persons. Human beings without any pathological inheritance, and who escape all serious external injury, may regard themselves as candidates for a hundred years of life. The centenarians are the last survivors of their age-group; when all their contemporaries have passed away, they alone have resisted all assaults upon their health, and continue to live on, like ancient trees that have defied the inclemencies of the seasons.

The centenarians, by reason of their rarity, have always attracted much attention from their contemporaries. There is a quite considerable literature dealing with centenarians, and recently these biological exceptions have been the subject of serious and intensive research.

Superficial consideration might lead one to assume that centenarians were more numerous in the past, and that there are more centenarians in foreign countries than in our own.

Old Age

The first census of centenarians took place, as Pliny the Elder (A.D. 23-79) relates, in the year A.D. 76. The Emperor Vespasian decreed that all centenarians in the region between the Apennines and the Po should be numbered. Thereupon 127 centenarians were registered, three of whom actually stated that they were 140 years old.

In the second century A.D. the Syrian Lucianus published a list of centenarians, in which twenty-seven kings figured, seventeen philosophers, three historians and four men of letters. Such catalogues of centenarians were made in later centuries: one by Francis Bacon (1561-1626), containing fifty names, and one by Albrecht von Haller (1708-77), containing eighty. The names included in Bacon's and von Haller's lists were mainly those of personalities of classic antiquity; and no evidence was adduced in verification of their ages. It is only during the last hundred years or so that there have been any reliable censuses in the countries of western Europe, and during this period the number of centenarians has diminished progressively. In the Bavarian census of 1871, thirty-seven persons declared that their age was 100 or more; but it appeared, after searching inquiry, that only *one* case was authentic; in reality most of the remaining 'centenarians' were not even 90 years of age, and one of them was only 61. In the Prussian census of 1880 no less than 359 centenarians were registered; in 1885, under stricter control, there were only 91, and in 1890 this figure had fallen to 72. In Scotland, since 1910, the census officials have kept a special look-out for centenarians. The claim to have reached the age of 100 years was investigated in 301 cases. Of these 155 were found to be genuine; they comprised 18 men and 137 women. The oldest woman was 106 years of age, the oldest man, 103.

The oldest man whose age could be definitely established was the Canadian bootmaker Pierre Joubert; he died at the age of 113. There are many references in books to one Henry Jenkins, who is supposed to have lived to the age of 169, and to Thomas Parr, who is alleged to have died at the

The Centenarians

age of 152. Thomas Parr achieved a certain degree of fame, because he was received at the court of King Charles I, and because his corpse was dissected by the great William Hervey (1578-1657) who discovered the circulation of the blood. Dr. Maurice Ernest, a London physician well known for his researches into the problem of old age, was able to establish, after examining all the relevant documents, that neither of these famous patriarchs had actually reached his hundredth year; he even showed that old Parr was a conscious swindler. He further stated that his investigation of this problem had taught him how extremely cautious one should be in accepting all reports of exceptional longevity: "I can truthfully say that there are few topics of human interest that have been more thoroughly obscured by ignorance, mendacity, and deliberate fraud than the subject of the extreme life spans hitherto attained by man as well as animals."

It is not surprising that reports of the particularly numerous occurrence of centenarians should come from foreign countries. For a long while Bulgaria was reputed to be rich in centenarians. At the census of 1926 the unusually great number of 1,756 centenarians was recorded. Soon after this a special commission was appointed, under Michaykoff, by which these figures were checked, case by case. The result was, that the data stood the test of close examination in the case of 51 persons only—13 men and 38 women. It can hardly be by chance that most of the reports of especially remarkable longevity come from countries whose registrars' offices, until only quite recently, were by no means such as to satisfy modern requirements.

If we run through the names of the centenarians who have been mentioned in the Press during the last few years we shall find that they all hail from distant countries. In 1930 Zaro Agha made his appearance. He was alleged to have been born in 1774, in Kurdistan; and he remembered seeing Napoleon, in 1795, at the siege of Acre. In 1934 the news came from Parana, Brazil, of the death of José Pacifico, at

Old Age

the age of 129. In 1935, at Malmesbury, South Africa, Esau Marman was said to have departed this life at the age of 118. In 1938 the London *Times* contained an article from a special correspondent describing an interview with Ramonotwane, born in 1815, as "the oldest man in Bechuanaland."

Since the public appears to delight in such reports, they continue to appear. It is said that M. Millaud, the founder of the *Petit Journal*, urged his editors to report the death of a centenarian from time to time. "It tickles the subscribers," he used to say.

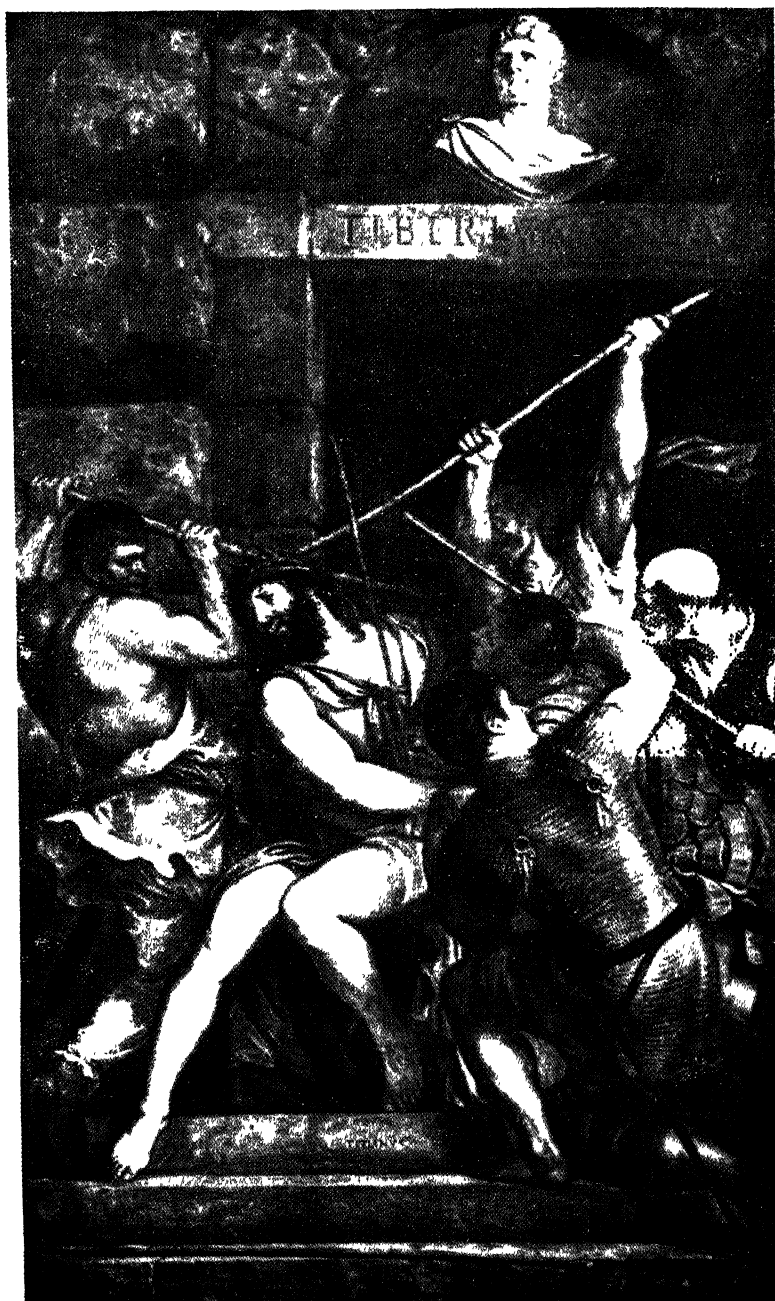
More informative than any absolute figures is the analysis of large groups of centenarians. Dr. J. H. Greeff, a Stuttgart physician, investigated the cases of 124 centenarians who were living in Germany in 1930, and examined many of them personally. Here again the women were in the majority: there were 81, against 43 men. Of the 81 women 80 had been married; of the 43 men, 41. After the evidence of these figures the importance of marriage as a factor of longevity can hardly be denied. Moreover, the marriages of these centenarians were above the average in respect of fertility. The married female centenarians could boast of an average of 5.8 children per head! In Bulgaria, Michaykoff found that the average centenarian's family consisted of 7.5 children.

The investigation of the pedigrees and family trees of the centenarians was naturally attended with considerable difficulty. However, the frequent occurrence of long-lived brothers and sisters was conspicuous.

Dr. Greeff's observations regarding the diet and general habits of his centenarians were very remarkable. Generally speaking, it is to be noted that their diet is in accordance with the ordinary usages of the various localities. Among the 129 German centenarians there was not a single vegetarian. They showed a striking predilection for fat in the form of bacon. The normal physiological disappearance of fat in old age seems to require some compensation. There

Titian (Tiziano Vecellio) 1476-1576

- II. Christ Crowned with Thorns 1542 (Paris, Louvre)
The work of the 66-year-old painter
- III. Christ Crowned with Thorns 1570 (Munich, Alte Pinakothek)
The work of the 94-year-old painter





The Centenarians

was no great craving for sweet dishes, farinaceous foods, or milk; vegetables were much appreciated, but little fruit was eaten.

A craving for spiced or pickled viands is not unusual in the aged, especially in men; it may doubtless be explained by the fact that the secretions of the mucous lining of the stomach are less abundant, so that a stimulant is desirable. One striking feature is the not inconsiderable consumption of alcohol by the male centenarians—and this not only among the East Prussians. Greeff observes, in this connexion: "It is amazing what such an old stomach can cope with!"

Among the female centenarians there were no smokers; on the other hand, among the 43 men there was only one avowed non-smoker. The amount of tobacco consumed varied, but there were many inveterate smokers.

The centenarians had not indulged in what we nowadays call sport. On the other hand, there were good gymnasts and swimmers among them. It almost always emerges that very aged men were excellent walkers in their youth, and very often in their later years. The sense of sight appears to be better preserved than the sense of hearing. Weight and stature are rather under the average. The weight of the women is generally just under eight stone; that of the men from nine and a half to eleven stone. The temperament is often described as lively, even very vivacious. The mood of these aged people is generally contented. The centenarian often had plenty of troubles in his youth, and later, in the period of maximum productivity; but it would seem that troubles temper a man's metal.

A recent statistical inquiry from Hungary, dealing with 1,376 persons above the age of 90, showed that 1,349 were or had been married, and only 27 were single. As regards bodily habit, 1,324 were thin or moderately covered, and some 56 corpulent; 32 weighed over twelve and a half stone. The greater number were non-smokers; as regards the consumption of alcohol, moderate drinkers or abstainers were in the majority.

Old Age

Fifty years ago Dr. G. N. Humphrey examined 824 persons over 80 years of age, of whom 79 were centenarians. In 73% he found an average degree of intelligence; 21 were intelligent above the average, and only 5% were feeble-minded. Among the centenarians some 50% showed no signs of defective memory.

Lastly, the personal statement of a centenarian is deserving of mention. This is a book by Dr. Guéniat, who died in 1935 at the age of 103. The book is entitled *Pour vivre cent ans*. Dr. Guéniat wrote it in his 99th year, and when he was 102 he had the satisfaction of presenting, in person, a third edition to the Academy of Medicine in Paris. The age of the author makes this book unique in the world's literature; it is also a proof of the possibility of intellectual achievement in extreme old age. In its profound and benevolent humanity, its intellectual vigour, and its keen observation, it makes delightful reading. This amiable Frenchman does not offer a recipe or lay down any rule for the prolongation of life. According to him, there can be no long life without inherited vitality; though this does not prevent him from advising his readers of a number of habits which he believes will conduce to longevity. This centenarian has found the practice of daily breathing exercises to be particularly beneficial. He recommends them emphatically in these lines of original verse:

“ C'est que, pour rester fort et reculer sa fin,
Il faut un vrai souci de respirer sans gêne,
Avec ampleur, un air bien nourri d'oxygène.”

Guéniat also favours the hormone- and organ-therapy founded by Brown-Séquard, and speaks with approval of the transplantation of glands, recommended and practised by Steinach and Voronoff.

OLD AGE AND LONGEVITY IN THE ANIMAL WORLD

“ God the Lord wishes to determine the lifetime of his

Old Age and Longevity in the Animal World

creatures, and to the ass, the dog, the ape, and lastly the man, he allots thirty years each; but for the animals this is too much, and God has compassion on them, and gives the ass only eighteen years, the dog twelve, and the ape ten years; man, with thirty years, has too little, and God has compassion on him and gives him also the eighteen and the twelve and the ten years of the animals. Hence for the first thirty years of his life man lives a human life; but then, in succession, come the burdened years of the ass, and the snarling years of the dog, and the foolish years of the ape, the laughing-stock of the child."

According to Wackernagel, this fable from Grimm's fairy tales is undoubtedly of Oriental origin. It is not a solitary example of the fact that men are fond of trying to establish some relation between their age and that of the animals, their companions; and this not only in folklore, but also from a scientific standpoint. Aristotle (384-322 B.C.) wrote of the duration of human life, and adduced comparisons from the animal world. He assumed that as a general thing large animals live longer than small ones, but he also points to exceptions to this rule. Further, he suggests that the duration of life is in relation to the period of growth. Francis Bacon (1561-1626) investigated the problem of the duration of life in men and animals, and asked himself whether there was not some relation between length of life, on the one hand, and on the other, the period of gestation, the period of growth, size, fertility, and the mode of life. He arrived, however, at no conclusion, bewailed our scanty knowledge of the subject, and left the problem unsolved. Buffon (1707-88) attacked the problem again, and this he did entirely in the spirit of the eighteenth century. In his well-ordered cosmos there were few unsolved problems. "The duration of life as a whole may in some way be measured by the duration of the period of growth." And since in every animal species the time of growth is of a definite duration, determined by the nature of the animal, so the length of its life represents a stable quantity. As every species of animal attains only a definite shape and size, so

Old Age

the limits of a certain duration of life cannot be transcended. Buffon writes: "Length of life depends neither on habits nor on custom, nor on the quality of nutriment. Nothing can alter the iron laws which determine the number of our years, except a superfluity of food and a too abundantly furnished table."

Buffon assumed that in man the period of growth is fourteen years, and the duration of his life six or seven times this figure: that is, from ninety to a hundred years. Flourens (1794-1867) adopted Buffon's theory, but finding that it lacked any exact determination of the period of growth, he sought for some anatomical feature which would indicate the completion of this period. He found such a feature in the consolidation of the epiphyses, the lines of growth of the long hollow bones. In human beings consolidation is completed in the twentieth year of life. According to Flourens the duration of life is five times this figure: "Man needs 20 years to grow; he lives five times 20 years—that is, 100 years; the camel grows for eight years and lives five times eight years—that is, 40 years; the horse grows for five years and lives five times five—that is, 25 years." According to Flourens, his law holds good only of the mammalia. His theories were subsequently re-examined and critically modified by G. von Bunge. Bunge pointed to the time which a newly-born mammal needs to double its weight. A glance at this space of time in the case of the various animal species shows that there are extraordinary differences in the rate of growth. The human child needs 180 days to double its weight, the horse only 60 days, the sheep 15 days, the dog 9 days. Bunge was not attempting to establish a law by means of these figures, but only to stimulate further research.

Élie Metschnikoff believed that the great and striking differences in the duration of life could be explained by his theory of nutrition and the organization of the digestive system. Comparative anatomy told him that the large intestine is longest in the mammals. In the comparatively

Old Age and Longevity in the Animal World

long-lived fishes the large intestine is a quite insignificant portion of the digestive apparatus; in the amphibia and reptiles it is somewhat larger; it is still very little developed in the birds, with the exception of the *Cursores* (ostrich, nandu, etc.). In the large intestine a profuse bacterial flora multiplies, which secretes toxins, and so injures the whole organism. Metschnikoff believed that auto-intoxication—that is, self-poisoning by the large intestine—is responsible for the relatively short life of individual animal species. He found evidence in support of this assumption in the bacteriological examination of the contents of the intestines of various species of bird. While in most of the birds the contents of the intestine prove to be poor in bacteria, the *Cursores* or running-birds, the ostrich and the cassowary, show a very luxuriant intestinal flora. The longer the large intestine the more luxuriant the intestinal flora, and the shorter the life. Metschnikoff, however, was well aware of the one-sidedness of his theory. He himself spoke of hidden factors which determine the duration of life and condition longevity in the animal kingdom. “Arduous work has yet to be undertaken before the problem finds a satisfactory solution in the near or distant future.”

As a matter of fact, we know very little as yet concerning the length of life in the animals; in any case, much too little to afford any support for the above-mentioned theories of Buffon and Flourens. We know more or less how long the domestic animals live but our data concerning the lifetime of wild animals in our temperate zone are still very limited. As for the animal world of the tropics and the arctic zones, for the time being we can say nothing at all. It is only of recent years that the scientists have endeavoured, by ringing or otherwise marking individual specimens, to obtain positive data, and to keep accurate records of the dates of birth and death in our zoological gardens and aquariums.

An approximately accurate determination of age is not possible even in the case of man, as was emphasized by the clinician L. R. Müller, in a treatise on the estimation of age

Old Age

in the human being. On the basis of numerous signs and symptoms we can attempt an approximate estimate; but even an autopsy does not carry us much farther. For the precise determination of age we have to rely on documents and the statements of third persons. Annual rings, from which the age can be read, occur only in trees. At the autopsy of a tree the forester can count the number of annual rings in a cross-section of a felled tree; that is, he can really determine its age. The number of rings discovered when the tree is sawn in two corresponds with the number of years the tree has existed. Owing to the varying growth of the cambium—that is, of the embryonic xylem or wood-tissue—which in spring, under the influence of heat and light, produces wide-meshed wood-cells, while in autumn the cells are much smaller, and in winter the cambium rests from growth—wood of differing densities is produced, and so the annual ring is formed. The age of the living tree can only be ‘estimated’ by the botanist on the basis of experience. This estimate is made by comparing the thickness of the trunk with the dimensions of felled trees of the same species, in which the rings have been counted. Such an estimate can never be other than rough. Different soils and conditions of moisture, variations of the meteorological conditions, and also diseases which affect the trees, may lead to false inferences.

Now, there are certain animals with rigid structures, like the scales of the fishes or the shells of mussels, in which the growth of laminations enables us to determine their age. As we know, the growth of animals occurs mainly during the warm seasons of the year. The lines of growth in the shells of mussels and the scales of fishes correspond with the number of favourable seasons through which the animal has lived. In certain species of higher animals the development of the horns and antlers and the abrasion of the teeth afford valuable data for the determination of age. G. Stroh has shown that by means of the teeth and the horns it is possible “to determine the age of the chamois with an accuracy

Old Age and Longevity in the Animal World

hardly possible in the case of any other animal, least of all in the case of cattle, subjected to the levelling influences of domestication. The development of the teeth, which takes about three and a half years, and the regular interruption of the growth of the horns in winter, make such determination possible." In the mountain winters, where the winds are tempestuous and the snowfall heavy, the chamois do not seek out their pastures; at such times the growth of the horns is interrupted, and so every winter a perceptible ridge is formed on the horn, as it ceases to grow; a malnutrition-ring. In the animal's first few years of life the rings are far apart. The greatest growth of horn occurs between the first and second years; from this time onwards the growth diminishes slowly and systematically. The succession of rings agrees with the calendar years for perhaps four or five years; then it begins to be irregular and uncertain. The growth depends not on the calendar, but on periods of sunlight and abundant nourishment.

The cow's horn also shows rings from whose number one may read the animal's age approximately. In other animals, as in man, we have no essential data in the growth of horns or antlers on which we may rely for the determination of age; in their case only an estimate of age is possible.

The determination of the age of fishes by observing the so-called growth-lines on the scales shows that the catfish (*Wels*), with its life of 60 years, is the most long-lived freshwater fish. After it comes the eel, with 50 years; the trout, with 20; and the salmon, with 13.

Thus, the fishes are comparatively long-lived, although they do not reach the uncommonly great ages that used to be ascribed to them. In old books on natural history the life of the salmon is given as 100 years. Buffon states that the carp lives to the age of 130. The carp in the ponds of the royal châteaux of Chantilly and Fontainebleau were believed to be exceptionally aged until E. Blanchard was able to show that the majority of these inhabitants of the royal fishponds were devoured by the plundering mobs

Old Age

which broke into these châteaux during the French Revolution. In the fishes the powers of reproduction continue throughout life. Here they differ from the mammalia, which outlive for many years the loss of generative power.

One animal that enjoys a particular reputation for longevity is the giant tortoise. Individuals of this species living in zoological gardens were believed to be from 200 to 300 years old. Major S. S. Flower, the former director of the Zoological Garden in Cairo, who made a special study of the duration of life in animals, investigated this claim. He was able to prove in the case of only one specimen of a giant tortoise, *Testudo Daudinii*, that it had lived to the age of 120 years. Now, a calendar year as lived by one of the lower vertebrata, such as the tortoise, cannot be compared with the human year. A tortoise spends only half the year in a state of positive vitality; the rest of the year is occupied by periods of lethargy. It has struck observers that tortoises grow very slowly in captivity: only an inch or two in a year. Now, two American scientists, Ditmars and Townsend, have shown that under favourable conditions, approximating very closely to those of the animal's natural habitat, their growth is very rapid; annual increases of weight as great as 100% were recorded.

For the purposes of his inquiry, Townsend obtained more than a hundred giant tortoises, which he boarded out in various localities in the Southern States of the U.S.A., where they grew with surprising rapidity, as compared with tortoises kept in captivity in London, with its winter frosts, and other cities. One giant tortoise developed in seven years from a young specimen of 29 lb. to a monster of 350 lb.

One peculiarity of the tortoise, which it shares with other reptiles—for example, with the crocodile, another very long-lived creature—is that it does not stop growing in length until comparatively late in life—very often not until its thirtieth or fortieth year. The giant salamander also grows very rapidly while it is young; then follows a period of greatly retarded growth, and finally growth ceases altogether.

Old Age and Longevity in the Animal World

The higher vertebrata were reported by the earlier naturalists, such as Buffon and Albrecht von Haller, to reach a surprisingly great age. Here again modern science has shown that all such claims were much exaggerated. The camel has a life of 40 years at most; domestic cattle live for 20 to 25 years; the horse may reach the age of 30. Cattle are capable of reproduction at the age of three; the cow has a milking period of 8 years; but in her twelfth year signs of physical decay make their appearance. Even the elephant rarely lives beyond its thirtieth year—at least, in captivity. Of course, individual exceptions are known. The record, for European zoo-elephants, was made by the well-known "Lilli," who lived 47 years in the Dresden Zoo, and was probably four years of age on her admission. "Jessie," in the Sydney Zoo, died in 1938 at the age of 67. It is possible that elephants live longer in the wild state. Careful observers believe that the Indian elephant lives a hundred years. In this connexion, we know that the elephant grows very slowly; its growth is not completed until its thirtieth to thirty-fifth year; on the other hand, it is sexually mature at the age of six months, and at the age of six years the cow elephant drops her first calf.

According to Hediger, who has collated the data furnished by zoological gardens and menageries, the duration of life of the larger carnivora is as follows: leopards, 15 years; lions, 20 years; tigers, 20–25 years; hyenas, 20 years; polar bears, 35–40 years; brown bears, 40–45 years.

The insectivora and the bats do not live longer than 5 years; the hedgehog, in captivity, rarely exceeds 4 years. On the other hand, the echidna has been known to live 27 years in captivity. Small rodents, like mice, rats and dormice, live 6 or 7 years.

Now, it is well known that of the animals in our zoological gardens the majority succumb to infectious diseases. Post-mortem examination of monkeys and apes in the Breslau Zoological Gardens revealed the fact that 66% of the deaths were due to bacterial causes. Newly-acquired specimens,

Old Age

by introducing some infectious disease into a cage inhabited by a group of animals, may be responsible for an extraordinary rise in the death-rate. For this reason, in considering data relating to the duration of life in animals, we should pay less attention to the average than to the maximum duration, especially where only a few animals are in question.

We are, naturally, particularly interested in the age of the great anthropoid apes. G. Brandes has carefully collated the available data. He finds that the gorilla, which develops most rapidly, reaches puberty about the age of $4\frac{1}{2}$ years, and the chimpanzee between the ages of 8 and 10; the orang-outang later still. At 20 years the anthropoid apes are old, and soon become senile; they rarely live longer than 30 years. It has been observed, in the case of the anthropoid apes, that training seems to delay the onset of senility. But concerning the phenomena of age in the animal world as a whole, and also concerning the causes of death, very little is known as yet; if only for the reason that one very rarely finds the dead body of a wild animal. We may assume that the wearing-down and loss of the teeth affects and finally hinders the assimilation of food. It is interesting to note that in the birds the external appearances of age are very rarely observable. The captive condor, for example, adorns himself every year with fresh plumage, and a fine ruff.

The animal knows only one generation. Representatives of three generations of animals are never seen together. The old stallion is driven off by a youthful rival, and withdraws into solitude. Even among the anthropoid apes we never find more than two generations living together. Animals that survive into old age are mostly excluded, without conflict, from the herd.

From this very brief and incomplete survey of age and ageing in the animal world we can see how extremely insufficient is our knowledge of the subject, in spite of a number of interesting individual observations. We can state that with few exceptions the age-limit of the vertebrata

Old Age and Longevity in the Animal World

lies about the fiftieth year. Most of the mammalia live for 15 to 20 years; only a few reach the age of 30 (bear, seal, whale, horse, rhinoceros, tapir, hippopotamus). The only mammalia to live more than 50 years are the Asiatic elephant and man.

At the beginning of this chapter it was stated that even in ancient times the attempt was made to discover certain relations between the duration of human life and that of the animals. Our brief survey has shown us that not only in respect of the biological ratio of the duration of life, but also as regards other factors of the ageing process, there are striking deviations from the circumstances of animal life properly so-called. Particularly evident is the deviation from the duration of life in the anthropoid apes. The zoologist Portmann suggests that the specifically human activity of the intellect should be regarded as an important factor in these deviations. According to him, the long-protracted period of growth toward maturity, and the slow ageing of the body, are compatible with great possibilities of later and more protracted intellectual activity. Even in man, of course (the zoologist argues), the vital curve may follow a downward course in many respects like that of the animals; and the decline of the intellect may correspond with the decadence of the body. But the possibilities are richer and more extensive than in the animal. We have in mind the astonishing fact that many of the great intellectual creations of man were the achievements of old age; that in art and scientific research astonishing heights of achievement have been reached very late in life. A biologist who in his survey of the human species should overlook or insufficiently regard this tremendous possibility of the pre-eminent intellectual activity during the phase of senescence would be forgetting one of the fundamental characteristics of the human species, which cannot be simply referred to animal conditions, although here again the special co-operation of intellectual activity can be demonstrated in many details of life. . . . Hitherto the treatment of the problem of age from the

Old Age

medical and biological standpoint has often been quite inadequate, because it pays too much attention to the vita curve of the animal, and not enough to the 'given' speciality of the human being.

PROLONGATION OF LIFE AND REJUVENATION

LIFE is inseparably bound up with its antithesis, death. But man would fain ignore this antithetical nature of his existence, and abolish old age and death. Eternal youth was one of the earliest dreams of man, and in all ages he has been preoccupied with the problem of rejuvenation, of the prolongation of life.

But according to all that we have learnt concerning the hereditary character of longevity, and of the differing habits of long-lived men and women, only that individual has an authentic prospect of long life who comes of a vigorous strain, a 'tough' race. To some extent the biological horoscope can be cast at birth. Roessle refers to a text of the Gospel according to St. Matthew, vi. 27: "Which of you, by taking thought, can add one cubit unto his stature?" and commenting upon it, continues: "For as little as a man can add to his stature—that is, can artificially increase his growth—so little can he by artificial means add to the number of the years which his constitution and his destiny have allotted to him."

Who can answer the question of the peasant, who asked how it was that his horse, doing its heavy work day after day, lived as long as, or even longer than, the horse of the neighbouring landowner, which never did more than draw a very light chaise? We assuredly cannot alter the amount of vitality inherent in men; we cannot do anything to improve the mainspring that drives our vital mechanism. Yet attempts have never been lacking to retard, by some mysterious intervention, the pendulum that regulates our

Prolongation of Life and Rejuvenation

bodies and determines our physiological age. The attitude to the problem of prolonging life, as it impressed itself upon the clinician Wilhelm Ebstein, is perfectly comprehensible to any physician who has personal experience of a home for the aged. Ebstein writes: "When I was director of the hospital of the municipal poor-house in Breslau I had plenty of opportunity to make instructive observations in this connexion. Old men and women who looked back on a life full of privation, care and sorrow, and who, moreover, had been exposed to innumerable unhygienic influences, sometimes through their own fault, and sometimes not, often gave me occasion to consider whether a life ordered and governed in accordance with hygienic principles is in any way conducive to the attainment of a ripe old age, or whether this must not be attributed merely to a robust constitution, to the innate power of resistance of the human organism; and whether, when these preliminary conditions are not fulfilled, all efforts toward prolonging human life are not useless?"

Especially instructive are the investigations of the Zürich ophthalmologist Alfred Vogt in respect of twins. Vogt studied the appearance of the phenomena of senescence in the case of 19 pairs of monozygotic twins, whose ages ranged from 55 to 81. He ascertained a similarity in the senescence of such pairs of twins which was practically independent of occupation and mode of life. Grey hairs, incipient baldness, wrinkles, and certain degenerative changes in the eye made their appearance at the same age and in the same form. In certain of these pairs not only did a form of senile cataract appear at the same age, but it was in each case the same type of cataract! However, if one of the pair was exposed to particularly unhygienic conditions—for example, as a glass-blower—he developed exactly the same type of cataract as his twin, but a few years earlier. Consequently, these exact observations still admit of the possibility that the 'duplication' which occurs may be adjourned by the removal of various injurious influences.

Macrobiotics—that is, the endeavour to attain to greater

Old Age

longevity—even when it seems to be based upon perfectly serious and scientific principles, will always be regarded with scepticism by the determinists, who hold that all vital functions are determined by internal causes. This argument has been recently examined by Dr. G. Jonquière, a Bernese physician, who at the age of 71 wrote a *Practical Introduction to the Certain and Agreeable Retardation of Age*. Jonquière writes: “When some little time ago I chanced to tell a colleague and friend, of about my own age, whom I happened to meet in the street, that I was writing an essay on macrobiotics, he replied by asking me what I, an old determinist, was thinking of? Did I really believe that I could influence people in that way? In his opinion such an attempt was useless. I replied that, of course, there could hardly be any question of direct influence. Nevertheless, I should at least make the attempt, by my very full and exact instructions, to convert a number of people to my ideas: that is, to make them come to their senses and give up their old way of life, and begin, once their youth was past, to change it gradually into a systematic, hygienic mode of existence. All instructions to that effect were naturally attempts to determine actions.”

The approach to our problem depends entirely on the importance which we attribute to the inherited constitutional factors on the one hand, and on the other hand, to external influences of the environment and the mode of life. But it must be admitted, to begin with, that no inherited tendencies develop without the corresponding environmental influences, and that no environmental influence can evoke what does not exist in the individual's inheritance.

Any view of the question will of necessity hesitate between optimism and fatalism. An optimistic interpretation will tell us that although we cannot increase our inherent vitality, we can do it injury, and thereby bring about the premature and accelerated degeneration of our organism. We must not squander the vitality we have inherited. As Seneca said: “Non accipimus vitam brevem sed facimus”—we are not

Prolongation of Life and Rejuvenation

given a short life, but we ourselves shorten it. And Flourens writes, in pursuance of this line of thought: "With his morals, his passions, his troubles, man does not die, he kills himself." Lastly, a man may or may not have the good fortune to escape deadly perils. On the whole, humanity clings to the optimistic view: and the problem of prolonging life has always attracted it in many ways. It has been a favourite theme of the most sagacious thinkers, a happy hunting-ground for faddists, and an infallible bait for the charlatan and swindler. It would be impossible to enumerate all the recipes, elixirs of life, potions and electuaries which were prescribed, in antiquity, and in the Middle Ages, for the prolongation of life.

Curious means of averting old age are still employed by primitive peoples. If an epidemic threatens a Zulu kraal, the medicine-man procures the bones of a very old dog, an old crow, an old bullock, or some other old animal, and gives them to the sick as well as to the whole; for those who devour the bones of old animals should live to be as old as the animals from which they come.

We find something of the sort in Greek legend: in order to rejuvenate the aged Ægeus, Medea introduced into his veins a substance compounded of the liver of an ancient stag and the head of a crow which was said to have outlived nine generations of human beings.

Mention should be made in passing of the ancient belief that an old, worn-out body could be rejuvenated and preserved by the proximity of fresh, blooming youth. The most familiar example is the story of the aged King David, who lay with the young and comely Shulamite; *sed non cognovit eam*.

According to F. Lejeune there are many allusions in Arabic literature to the notion that intercourse with young women will preserve the ageing man from too rapid decay and keep him cheerful and fertile of ideas. The great Arab physician Avicenna is said to have applied this prescription to himself, until the day of his death, a therapy which not

Old Age

infrequently led to excesses. "For the rest, we know that the psychic stimulus conveyed by a new love affair or a younger woman invests the ageing man with energy and delight in his labours, and often indeed with a touch of genius" (F. Lejeune).

Old people—as the example of the centenarian Dr. Guéniat reminds us—are fond of giving their younger fellows instructions and recipes for longevity. Such instructions are contained in the "Discorsi della vita sobria" of the Venetian noble, Lodovico Cornaro (1467–1566). The author of these Discourses was an architect, a civil engineer and a Mæcenas. He constructed extensive and admirable drainage-systems, which provided work and bread for thousands, and transformed wide fever-stricken marshes into valuable and fertile soil. Even in his later years—and he lived to be 99—he enjoyed perfect mental and physical health. At the age of 83 he wrote his treatise, *Of the moderate Life and the Art of attaining a great Age*, which was translated into many languages and is well worth reading even to-day. It must be remembered that Cornaro lived and worked in an age when a faith in magic and alchemy was in the very blood, not only of the people, but of the cultured classes, who believed that healing and rejuvenation could be assured by swallowing "potable gold" and the "elixir of life." It was into this world that the youthful patriarch introduced himself, with gentle admonition and sober explanation, frankly and serenely announcing his doctrine to his contemporaries: Experience is the basis of all knowledge. And experience gives the lie to your quacksalvers. The panacea for which you seek so eagerly is plain for all to behold. Every one can test its miraculous effect: moderation in all things, and above all in the consumption of food and drink: that is the true "philosopher's stone!"—"who wishes to eat well eats little"; and "the food a man leaves does him more good than what he has eaten." In accordance with these two principles Cornaro ordered his own life; but only after he had spent a most dissolute youth, greatly injuring his health.

Prolongation of Life and Rejuvenation

At the age of 35 he withdrew into himself and restricted his diet to the barest necessities. To show how well this way of life had suited him, he described himself as he was in his eighty-fourth year: "My present life is no dead-and-alive existence, but most active, and of such a kind that all people esteem me fortunate. I am always in good health, and am so nimble that without help I can leap lightly upon a horse, and can without effort climb not only a flight of stairs, but a steep acclivity."

No one has described old age in more rosy colours than Cornaro. Later generations have derided this optimism, this moderation. Carlo Goldini, for example, the Venetian dramatist of the seventeenth century, declared that Cornaro had lived all his life as an invalid, in order to die in good health. Probably La Rochefoucauld was thinking of Cornaro when he wrote his 298th maxim: "It is a tedious malady, to preserve one's health by excessive regimen." And lastly, one may be tempted to ask whether Cornaro, who was obviously endowed with great vitality, did not achieve longevity in spite of his starvation diet, rather than because of it.

Cornaro had many successors. Almost three hundred years later Christian Wilhelm Hufeland (1762-1836) wrote his "*Makrobiotik, oder die Kunst das menschliche Leben zu verlängern*." While he himself was guilty of flirting with the superstitions and delusions of which so many were then the victims, he endeavoured to give his contemporaries valuable instructions as to the means of prolonging life—or curtailing it. In the didactic manner typical of the "Age of Enlightenment" the author, giving innumerable practical counsels, recommended temperance, frugality, virtue and prudence. To-day he strikes us as somewhat presumptuous when he seeks to dismiss Paracelsus—who likewise devoted himself to the study of Macrobiotics—as "one of the most shameless of charlatans and bombastic peddlers of longevity." Hufeland was only 35 when he wrote his book; young indeed for such a task; and Weizsäcker's aphorism:

Old Age

"In order to investigate life one must engage in life," which might indeed be accepted as the preface to all inquiries into the problems of old age, is especially pertinent in respect of Hufeland's book. Nevertheless, this work enjoyed a great success; it was quickly translated into all European languages, and to this day new editions have continued to appear.

But modern attempts at macrobiotics seek a basis in science.

We have already observed that the scientific treatment of the process of senescence has kept pace with the development of medical and biological knowledge. Similarly, the methods applied in attempts to prolong life, or to rejuvenate it, are in correspondence with the scientific tendencies of the age. Wholly immersed in the atmosphere of the bacteriological era of medicine, the biologist and Nobel prizewinner Élie Metschnikoff, of whom frequent mention has been made, published, at the beginning of our century, his theory of longevity. It is characterized by a robust optimism and an energetic repudiation of all fatalistic lines of thought. According to Metschnikoff the process of senescence depends on external factors and circumstances, and can therefore be influenced by human agency. As causes of premature age he held that alcohol, syphilis, and above all, intestinal putrefaction were mainly responsible. As a bacteriologist he assumed that the whole body was inundated by the toxic products of decomposition released by the parasitic bacteria of the bowel. Minute quantities of these products of decomposition found their way into the blood-stream. Pathological changes were thereby produced in the chemism of the blood, leading to metabolic disorders. The overloading of the blood with toxic substances results in secondary lesions of the cells of the body, and diminishes the organism's powers of resistance. For Metschnikoff the process of ageing was a malady produced by auto-intoxication from the bowel. As we have seen, this biologist regarded the large intestine as a harmful phylogenetic

Prolongation of Life and Rejuvenation

survival. Hence his aphorism: "The longer the colon, the shorter the life." A survey of the animal kingdom seemed to him to confirm his theory. The birds are comparatively long-lived, yet their metabolism is incomparably more active than that of even the highest mammalia. One would therefore assume that they must run through their capital of vital energy much more rapidly than the latter. No other creature is able to live so intensively, and so to economize time, as the birds. The conspicuous longevity of the birds, despite their extremely rapid metabolism, is, according to Metschnikoff, simply the consequence of their possessing no large intestine, so that stagnation of the fæces, intestinal putrefaction, and chronic auto-intoxication do not occur. As a prophylactic against auto-intoxication Metschnikoff recommended a mainly vegetarian diet, and the consumption of *yoghurt*, the Bulgarian sour milk. This contains the *Lactobacillus bulgaricus*, which, if introduced into the colon, proliferates there, stifling and suppressing the injurious bacteria. By this means the fermentative processes and the bacterial colonization of the bowel are fundamentally altered. This new state of affairs has the most favourable effect on the peristalsis, and the reabsorptive powers of the intestinal mucosa. As evidence of the correctness of his theory, Metschnikoff pointed to the fact that Bulgaria—where *yoghurt* is part of the national diet—is particularly rich in centenarians: an assertion which has proved to be unfounded on closer examination. Metschnikoff applied his methods to his own person, but he began only when he had already passed his fiftieth year. Despite a number of serious illnesses, which affected his heart, he lived to be more than 70, an age which had seldom been attained in the Metschnikoff family.

At the beginning of this century Metschnikoff's theory enjoyed great popularity. *Yoghurt* and *Lactobacillus bulgaricus* had their vogue as elixirs of life. But this fashion, like others, had its day; unfortunately, when it became obsolete the kernel of truth in Metschnikoff's doctrine was

Old Age

forgotten. For there was undoubtedly a great deal of truth in his teaching in respect of diet. A rational diet contributes greatly to health, and will undoubtedly avert or at least allay some of the disorders of old age. Modern dietetics has resumed and intensified the inquiry into the connexion between diet and longevity. The Danish food-reformer, A. M. Hindhede, is convinced that the non-albuminous diet which he recommends, consisting of wholemeal bread, potatoes, coarse oatmeal, and milk, with little addition in the way of meat and vegetables, contributes to longevity. "My own experiences of albumen-poor diet," he wrote in 1938, "are for me the best proof of its value. For the last 40 years I have been living on this diet, and at the age of 76 I do not feel an old man. Last year I cycled all over Denmark, covering about 80 miles each day."

Recently the Viennese physiologist Von Noorden has shown that corpulent individuals have about 30% less chance than others of attaining the normal average age. He follows this demonstration by a strong recommendation to take systematic and timely measures against incipient obesity. Prudential medicine has always paid great attention to obesity, pointing to its unfavourable influence as regards the duration of life. There is a constitutional form of obesity which goes with a brief duration of life. But the degree of obesity alone is not decisive. The factors which have led to obesity, or which maintain it, are important, and there are also certain organic lesions which must be regarded as consequences of obesity. Among the most frequent causes of obesity, according to G. Florschütz, is chronic alcoholism and, above all, immoderate beer-drinking. The senior medical officer of the Mutual Life Insurance Company of Norton, U.S.A. considers that the fat man who is also a beer-drinker has no prospect of reaching old age, as the disadvantages of obesity are intensified by the toxic effects of alcohol.

Some very interesting observations regarding the connexion between longevity and diet were made by Max

Prolongation of Life and Rejuvenation

Kuczinski, a professor in the University of Omsk, where he studied the nomadic Kirghiz of the Siberian steppes. Kuczinski was surprised to find that cases of advanced and premature arteriosclerosis were of very frequent occurrence among the Kirghiz. Even in men of 30 to 32 he repeatedly noted a strongly-marked *arcus senilis*—that grey, concentric clouding at the margin of the cornea which is produced by layers of fatty substances or lipoids in the lamellae of the cornea. These fatty substances are identical with cholesterolin. Apparently the Kirghiz are given to a diet rich in cholesterolin—that is, a diet consisting to excess of meat and milk. But this is not the only harmful factor. According to Kuczinski, three factors are responsible for the arteriosclerosis of the Kirghiz: lethargy, a meat diet, and disorders of the stomach and bowels. On the other hand, in the Russian peasants he found surprisingly few signs of arteriosclerosis, even in extreme old age, but he did find old men of youthful appearance, whose hair was still thick and untouched with grey, and whose sexual function was still active. They were not excessive eaters, but they were almost invariably great drinkers, living on soups, large quantities of bread, cucumbers, potatoes, and very little meat, and they had all been very hard workers. Kuczinski was greatly interested in the conditions revealed by the autopsy of a Russian peasant who had died at the age of 109. The walls of the blood-vessels were poor in elastic elements, but without any infiltration of cholesterolin or deposits of calcium. The arteries were old and worn, but not diseased. Details of this peasant's mode of life were recorded as follows: His staple food was bread; he drank a great deal of tea; and also considerable quantities of wine and spirits. He was a constant smoker. Libido continued up to the eightieth year. Kuczinski drew the following conclusions from his observations: Deterioration is part of the constitutionally conditioned process of ageing; the deposition of cholesterolin and calcium is favoured by errors of diet. According to him, the pre-conditions of longevity are:

Old Age

periodical states of hunger, and an intensive metabolism; active excretion of dangerous waste products; no complete rest. Examples: the Kirghiz does not feed his dogs; he lets them fend for themselves; he treats his horse in the same way. This regimen suits them admirably. Kuczinski recommends a frugal life with fasts and periods of hunger.

All these observations are uncommonly suggestive, however contradictory they may be. They show how complicated the whole problem is, and also how far we are from finding a solution.

In view of the importance assumed by the science of endocrinology, the doctrine of the endocrine glands and their hormones, it was inevitable that the problem of age should be brought into relation with this line of physiological research. We know to-day that glandular influences are at work, not only at puberty, but in every other periodical and phasic state of life, whether physical or psychological. How recent this knowledge is, and how quickly scientific tendencies and opinions emerge, we learn from the reminiscences of the clinician B. Naunyn (1839-1925), who in 1909 published a compendium of the maladies of the aged. Concerning this book, in his reminiscences, published in 1925, he said: "The reader may note with surprise that I gave hardly a thought to the glands with internal secretions, which play such an important part in senescence. I myself can hardly explain this, and I feel somewhat ashamed of the fact. For although the doctrine of the *secretio interna* was then still in its beginnings, enough was already known of the pancreatic glands, the thyroid, the adrenals, the mesenteries, and the thymus; and already the pancreas had familiarized us with its role in metabolism!"

To-day the endocrine glands and their influence on the regulation of the vital functions are very much to the fore. Since we know that different endocrine glands are of great importance in respect of growth and physical development, the assumption was bound to suggest itself that in involution also endocrine influences are at work. One by one, all the

Prolongation of Life and Rejuvenation

endocrine glands were brought into relation with the process of senescence.

To begin with, the gland that lies beneath the cerebellum—the hypophysis or pituitary body. The theory of the hypophysis was considerably advanced by the rare syndrome which was called, after its first observer, Simmond's Disease. Its victim exhibits the unmistakable symptoms of premature age; the grey hair, the dry, wrinkled skin, and the stooping posture. The symptoms present a picture of premature senility. On dissection one finds that the anterior portion of the hypophysis has been completely destroyed.

The thyroid also has been brought into relation with the ageing process. The stimulating effect of the thyroid gland on metabolism and growth is well known. Certain symptoms which we observe in cases of thyroid insufficiency have a close resemblance to symptoms of old age: falling of the hair, dryness of the skin, a general reduction of metabolism, increased sensitivity to cold. The aged aspect of certain hypothyroidal crétins has often been noted. Dr. Lorand of Carlsbad believed that he had found, in thyroid extract, a true elixir of life. It is a fact that in old people we generally find a shrunken thyroid and hypertrophy of connective tissue. But which is cause and which effect? Are the changes in the thyroid only part of the general involution of the organism, or do they cause the latter?

In view of the enormous importance of the sexual organs and the sexual functions in the rise of the vital curve toward puberty, it was natural to look for the connexion between the gonads and the ageing process. In the biology of the internal secretions the gonads are of special significance. The fact has repeatedly been confirmed that in long-lived, vigorous, enterprising individuals the sexual functions often remain intact; and, on the other hand, that premature old age occurs with the loss of these functions. The French physiologist Claude Bernard (1813-78) was one of the first to suspect that the testicles do not merely serve the purposes of procreation, but that they also exercise an endocrine

Old Age

activity. Bernard's successor, Charles Edouard Brown-Séquard (1817-94) suggested in 1869 that intravenous injections of extracts of animal testicles would increase the physical and mental powers of the aged. On the 1st June 1889, in a session of the Société de Biologie of Paris, he communicated a report on the result of personal experiments with glandular extracts. In this communication he stated: "I have always believed that the feebleness of aged males is due in part to the diminished functioning of the testicles." The fluid which he injected, 'the testicular liquid,' consisted of triturated testicular tissue, and blood from the previously ligatured testicular veins of dogs and guinea-pigs. He claimed, as the result of these injections, a renewal of vital energy, the disappearance of fatigue, and increased creative power. These subjective experiences were the only evidence which Brown-Séquard could adduce in support of his theory, and at the time this evidence was rejected by his audience, and by medical science. But this did not mean that the problem was shelved.

Eugen Steinach (1861-1944), in Vienna, by his experiments upon animals, was able to demonstrate the enormous importance of the sexual glands to the whole organism. He proceeded from the assumption that while on the one hand the formation of sperm-cells occurs in the testicles, on the other hand, the so-called interstitial cells pour a hormone into the blood, which has a specific stimulating effect on the organism as a whole. In 1903 two French physiologists, Ancel and Bonin, were able to show, by meticulous experimental and histological research, that not all the cells in the tissue of the testicles play their part in the production of semen, but that in addition to the seminal cells there are others—the so-called interstitial cells—which are of special importance in respect of their internal secretion, and particularly in respect of the development of the secondary sexual characters. Ancel and Bonin speak of an interstitial gland which is relatively independent of the seminal gland. Further, in the case of animals they were able to show that

Prolongation of Life and Rejuvenation

when the spermatic chord is ligatured the interstitial components of the testicle undergo further development. Steinach now assumed that invigorating and vitalizing secretions would be contributed to the blood by these interstitial cells. He called the interstitial gland of Ancel and Bonin the 'puberty gland.' He now directed his efforts toward stimulating this endocrine portion of the testicle to renewed activity. For his experiments he first selected rats, animals whose duration of life is known with some accuracy, and proceeded to ligature the spermatic chord. Following upon this operation he observed the atrophy of the sperm-forming portions of the testicle, but a fresh development of the inner-secretory, interstitial components. The animals, before the operation, were old and feeble; they were eating little, had lost their hair, were leading a lethargic existence, and betrayed no indications of the sexual instinct. They began, some three weeks later, to show a fresh growth of hair, and a renewal of muscular strength, and to take an interest in their environment; they again took pleasure in clambering about, and manifested an interest in the opposite sex. Further, their weight, on the average, increased by 600 grains. In this new condition they continued for about seven months; then the ageing process set in again, and the animals died. Steinach communicated a report on his first experiments to the Viennese Academy in December 1912. In 1920 the surgeon Robert Lichtenstern, at the instigation of Steinach, undertook for the first time the ligature of the spermatic chord in man. In the case of three individuals—one a prematurely aged man of 64, one in his 67th, and one in his 72nd year—an impressive disappearance of the symptoms of old age was observed after the operation. Steinach was endeavouring, by this operation, to bring about "the greatest possible enrichment of the physiological hormone of the gonad"; and he deduced from the results obtained that the aged individual is organically and functionally renewed, and that the natural, average limit of age can be exceeded. Both the results of Steinach's

Old Age

researches and the consequences of the interventions of his surgical collaborator have given rise to endless discussion; sharp criticism and flat rejection on the one hand, unreserved acceptance and unlimited enthusiasm on the other. The much-advertised writings of certain "rejuvenation doctors" are certainly not of a nature to inspire confidence in their methods. By promising the impossible—a second youth, "the rejuvenation of all functions, and the recovery of physical, intellectual and moral energies"—they have assuredly done nothing to advance their cause. Strangely enough, they never say how long the promised rejuvenation will endure; it has, however, been observed that after an operation a certain revival does at first manifest itself, but that this is followed by a rapid and, in this case, a final decline. As in the case of so many medical discoveries, the wave of uncritical enthusiasm has been followed by the phase of critical rejection.

Steinach himself, in his latest publications, has definitely dissociated himself from his enthusiastic disciples. He rejects the term 'rejuvenation,' preferring to speak of 'reactivating.' He holds out no prospect of "eternal youth, but rather a tolerable old age, within the natural limits, under optimum physiological conditions."

For the time being it can only be stated that these operative methods have not won acceptance, even in the case of stud-animals, where they ought to have been of great financial value. For some years now but little has been heard of the matter, which alone is enough to show that the results obtained were not efficacious. Successful methods of treatment are generally adopted; think, for example, of the triumph of insulin, and the success of the liver treatment in cases of anæmia.

But precisely the successful results obtained with insulin and preparations of liver ought to warn us against underestimating the possibilities of a hormone therapy in the treatment of the maladies of old age. It is Steinach's greatest merit that in consequence of his experiments chemical

Prolongation of Life and Rejuvenation

research was encouraged to proceed to isolate and manufacture glandular hormones. These new, chemically pure preparations will be the touchstone that will show what the hormone therapy can do for the disabilities of old age. So far one hears of beneficial effects, especially in respect of the general symptoms of old age. In so far as there is no question of actual organic disease, it does in many cases yield valuable results. Lassitude, a distressing proneness to fatigue, and a sense of inadequacy can be averted; the power of decision, the ability to concentrate, an appetite for work, the power of observation, and self-confidence are all perceptibly improved and stimulated. However, there is a time-limit to the favourable effect of these preparations. Steinach himself, during the last years of his life, made use of hormone preparations; and whatever the explanation may have been, he displayed, to the very last, an amazing vitality and capacity for work.

Our knowledge of the internal-secretory or endocrine glands is of very recent date, and it is still very sketchy. Almost every day brings us some fresh item of knowledge; now simple and trivial facts, mere bricks for the mighty fabric, now important discoveries that open fresh and unsuspected horizons. The more we learn of the nature and the effect of the hormones, the more complicated the picture becomes. No hormones are independently active; their influence is co-operative and reciprocal, and all are subject to the control of the brain. Despite our still imperfect and superficial knowledge of their action, the therapeutic application of the hormones has already yielded the most beneficial results. Maladies which a few years ago were regarded as incurable are now amenable to treatment. Reference has already been made to diabetes, Addison's disease, and pernicious anæmia. It would be unscientific to deny certain possibilities *a priori*. It seems to us by no means improbable that an active and capable old age can be prolonged. Even though the spring of eternal youth will never be discovered, we may hope that it will be possible

Old Age

to make the life of the aged better worth living, and to extend in no inconsiderable degree the limits of productive old age. But it must be always remarked that in the last resort all the organs, even the endocrine glands, are dependent on the nervous system and controlled by it. Therefore, in the last resort, the central point, the key position of a hale old age lies, in a certain degree, in the psychical sphere. All endeavours toward the maintenance of a hardy, capable old age must therefore take into account the psychological attitude in respect of old age.

MALADIES OF OLD AGE AND THE CARE OF THE AGED

WE have already spoken of the declining phase of life as the dangerous age. Not only do many maladies make their appearance in old age which are connected with the processes of physical deterioration, but such disorders as may occur in all phases of life assume a different and very often a more dangerous character in the later years. Pneumonia has already been mentioned as a typical example. In this disease the influence of old age is plainly visible; the malady progresses slowly; congestion clears up slowly and often imperfectly; disorders of the circulation and respiration are of frequent occurrence; and these are connected with a defective functioning of the innervation of the blood-vessels. The course of other acute maladies also assumes a particular form in old age. It is characteristic that the maladies of old age, as they run their course, are attended by an actual poverty of symptoms (A. Müller-Deham). In the disorders of old age there are no dramatic crises. This is particularly striking in diseases of the digestive organs. In old age acute disorders, such as inflammations of the gall-bladder and the appendix, and the perforation of gastric ulcers, may be accompanied by the most trifling subjective symptoms. Even the objective signs are very often absent or barely perceptible. Stimuli do not evoke

Maladies of Old Age, and the Care of the Aged

quite the customary reflexes; the action is weakened. Even the general reaction is enfeebled; we know that in old age the bodily temperature is affected; the rise of the thermal curve on the appearance of pathological symptoms is often slight, or there may be no rise at all. Variations of the blood-pressure and irregularities of the pulse must not be interpreted as they would be in the case of young people; and often enough the appearance of sugar and albumen in the urine has not the same ominous significance. Diagnosis is more difficult in the case of an aged patient, and greater demands are made on the physician's powers of observation. In the first and middle phases of life the physician can usually take it for granted that only *one* principal disorder is present, and he will rightly try to interpret all symptoms in relation to this main disorder. In old age the case is different; for then there is a greater possibility that several disorders may occur at one and the same time. Many an aged body is "a pathological museum." Those maladies may appear simultaneously which are connected with the degenerative processes: arteriosclerosis, diabetes, chronic arthritis, emphysema, and prostrate disorders. The older the patients, the more frequently do these maladies make their appearance. The human species, when it attains extreme longevity, has a different death-rate. For the physician, the treatment of aged people is a task of a very special character.

Most old people surround themselves with a complication of habits which they regard as of great importance to their health. Very often such habits concern the smallest details of daily life, extending to diet, clothing, sleep, and medicine. It will be the special task of the physician to discover these habits, and without urgent reason he will do nothing to derange them. Yet it may be that precisely some such rooted habit is the cause of an illness.

One must also have regard for the anxiety which only too often determines the whole psychic attitude of elderly patients. Very often it is present only in the unconscious,

Old Age

but it becomes manifest on the slightest indisposition. Against this anxiety the aged person reacts with typical defensive measures. One such measure is an allusion to the absence of the symptoms of age; "Dr. X tells me my blood-pressure is that of a young man."

As a result of the narrowing of the intellectual horizon in age the old man's interest is only too often confined to his own physical sensations. Old people expect the physician to have a thorough understanding of this interest. Their troubles must be taken seriously; the doctor must consider them sympathetically, and his examination must be just as careful and minute as it would be in the case of a youthful patient. It is just here that the young doctor often falls short. Such a youthful physician had to pay regular visits to an old lady, who had nothing in particular the matter with her. He thought it was enough to have a little pleasant conversation with her. "How times and medicine have altered!" the old lady said on one occasion, "in my day the doctor used to feel one's pulse every time!" Aged patients do not only demand special attention; most of them have their definite opinions as to what does and does not suit them. And, as a matter of fact, in old age the tolerance of medicaments is quite different from what it is in youth.

The position of surgery as regards old age is of special interest. At the German Surgical Congress of 1923 Professor Hotz spoke of the age of the patient as the surgeon's adversary. He was then, however, speaking of surgical intervention in cases of biliary calculus. It is, of course, a matter of common experience that with increasing age any surgical operation involves a certain danger. Generally speaking, it is usual to regard the close of the fourth decade as the end of the optimum age for surgical treatment. The powers of resistance against illness, wounds and operations are greatest in the teens and twenties. Now it is not the danger of the operation itself that imposes caution on the surgeon, but the sequelæ of the operation. However, with the progressive postponement of old age the

Maladies of Old Age, and the Care of the Aged

methods of the surgeon will undergo certain modifications. Consider, for example, the increasing attention given to the surgical treatment of affections of the prostate. The technique of the operation is increasingly adapted to the age of the patient. With an optimistic attitude on the part of the surgeon and the nurses, which communicates itself to the patient, with the application of suitable measures in prevention of post-operative complications, and with a thorough preliminary treatment of existing organic weaknesses, the surgical treatment of elderly patients may look forward to great possibilities of further success. Compared with the long recognized and highly developed therapy of infantile maladies, the treatment of senile disorders is a neglected branch of medicine. Here the altered composition of the population will doubtless bring about a change. "It seems to me very probable," an English physician wrote in the *Lancet* in 1938, "that in years to come every medical faculty will have its chair of senile pathology." And recently Emil Abderhalden and M. Bürger have expressed precisely the same opinion. In an introduction to the new *Zeitschrift für Altersforschung* they write, "A great stimulus to the effort to advance research into the problems of the ageing organism, to the benefit of mankind, is provided by the tremendous development of the medical treatment of infants and children. The time is not so very long ago when the creation of pediatrics as a separate branch of medical science met with strong opposition. Since that time both research and teaching, in respect of the growing individual, have made uninterrupted progress. To-day it is regarded as a matter of course that the juvenile organism, in respect of its diet, its reaction to illness, and its proper treatment, represents a special case. Without a doubt, before many years have passed it will be regarded equally as a matter of course that special attention should be paid to the ageing organism."

Inquiry into the problem of senescence as a process—a problem of ever-increasing importance—is particularly active in the U.S.A. The 'Josiah Macy Jr. Foundation,'

Old Age

a generous endowment for the purposes of medical research, has included in its programme the study of senescence with its physical and mental consequences. The excess of aged individuals in America, we read in the charter of the Foundation, has the consequence that many men and women in the declining phase of life find themselves confronted with extremely onerous demands on their powers of adaptation, demands which as yet we hardly realize, and to which we are not adequate. In this situation psychological reactions will occur which call for some assistance; in already advanced age these reactions will give rise to mental and physical disturbances. "It is impossible to say at the present time which of the debilities of the older person are expressions of normal senescence and which are due to pathological processes associated with old age."

There will always be old people who have to give up their independent life in order to spend the evening of their days in public or private homes for the aged. It must be admitted that such assemblages of aged people have not a few disadvantages. If we consider that adaptability, in particular, declines with increasing age, we shall realize what demands so complete a change of environment and general mode of life must make on the old people. When it is anyhow possible they should be left in their accustomed surroundings. The sight and the close companionship of contemporaries who are suffering from premature senile debility, or pathological symptoms of senility, undoubtedly set up a dangerous autosuggestion. As far as possible a solitary old person should be enabled to find a refuge with relatives.

Homes for the aged, if possible, should be connected with other institutions, so that the old people are still in some manner in touch with life. This arrangement may provide opportunities for some useful and highly necessary occupation. For even the aged long for useful and purposeful work. Meaningless labour, such as is described, for example, by Dostoievski in his *Memoirs from a Deadhouse*, is deadly both to mind and body. The physical and psychical influence

Maladies of Old Age, and the Care of the Aged

of occupation in human beings is enormous; and in every kind of calling the psychical motives play a very great part. Habit, duty, emotion, material and personal interest, and ambition are the mainsprings. Now, in a home for the aged we are dealing solely with people who are excluded from all professional activity. For this reason some substitute for such activity is urgently needed. From personal experience in Basle I can bear witness to the highly beneficial result of including the home for the aged in the municipal hospital, which comprises all the municipal clinics. The inmates of the old people's home are enlisted for all sorts of auxiliary work in the clinics and the dispensary; they feel that they are useful members of a great, living concern, and they recover their self-respect and self-confidence. The transplantation of old people into a fresh community brings them new duties, and also new connexions and fresh possibilities of action. When old folks are offered the opportunity of serving their fellows, with their experience, their maturity, their patience and silence, much psychic energy is harnessed and controlled which would otherwise run amok in pathological symptoms, whims and crotchets, senile maliciousness, and the longing for death. Even the best equipped home for the aged cannot compensate for these disadvantages if the old people are completely excluded from active life. It was for this reason that the 'ideal' home for the aged, the *gerocomio ideale*, as described by the Italian anthropologist Mantegazza, in his book *Elogio della vecchiaia*, would become a curse rather than a blessing to the inmates. Mantegazza situated his 'ideal' home in a country with a mild climate—in California. He even hoped that his *gerocomio* would develop into a 'Geropolis,' a State of the aged. The entertainment of the old people would be assured by organized games, libraries, the choice of pretty young women as attendants, and pleasant excursions. Melancholy would be officially proscribed, and the jovial ancient would be distinguished by the 'Order of Happy Old Age,' *l'ordine della vecchiaia felice*. The sick and the dying would be removed as quickly as possible.

Old Age

However well-intended such a project might be, its realization would be disastrous to the old people to whom it was to have brought happiness. The curse of the aged, boredom, *l'ennui mortel*, would establish itself with aggravated power in precisely such an unreal institution, defeating its benevolent intentions. The old ought *not* to be withdrawn from the world of the living; so far as possible they should continue to share in the joys and sorrows of the community.

An institution for the aged of which reports have reached us from America appears to be more in touch with reality. In 1933 Dr. McKeever opened in Oklahoma City a 'School for Maturates.' In his medical practice he had very often come upon old people who were neglected by their relatives. The fate of these unwanted old people led him to espouse their cause and alleviate their lot. Accordingly, he founded a model school for people of advanced age, making a special study of the diet of old people, their physical exercise, suitable occupations for their leisure hours and, in general, every sort of activity. In the first scholastic year he had 200 pupils; by the end of the third year there were 935, most of them over 75 years of age. The virtue of McKeever's ideas is that the old people are rescued from idleness, they remain in a living environment and, as far as possible, are still closely allied with it.

Of course, we cannot eliminate from human destiny the tragic aspects of the declining phase of life; and it would be dishonest to pass over them in silence. The decay of the intellectual and physical faculties, the loss of friends and relations, and the consequent loneliness, cast their black shadows over the final term of human life. And for how many old people are these troubles increased by illness and infirmity, which make any communal life almost impossible! Of such old people we can only say, with R. Lichtwitz: "People who are suffering under the burden of their years are performing their last service to humanity, inasmuch as they foster and stimulate the desire to help, the love of one's neighbour, and the sense of community."

III

SOCIETY AND THE
INDIVIDUAL:
THEIR ATTITUDE TOWARD
OLD AGE

THE PROBLEM OF OLD AGE IN OTHER CIVILIZATIONS

IN all periods of human history, as Jakob Grimm has told us, men have felt the advance of age to be an evil, or have broken into lamentations over its approach. Yet periods of history and individuals alike vary in the extent to which they resign themselves to the irrevocable, or take the sorrows of age, and the dread of its advent, seriously enough to speak of them to the world and posterity. The attitude towards one's own old age, and to old and ageing people in general, varies greatly among people of different civilizations, and it changes also in the course of time.

If we attempt to make a survey—of whose somewhat arbitrary nature and limits we are well aware—we will first direct our attention to the ancient Greeks. Jacob Burckhardt, in his final estimate of the Greek way of life, speaks of the Greek attitude to old age: "Age assumes a very special place in the lamentations concerning this earthly life. It is true that many famous Greeks attained a ripe old age, and a very vigorous old age at that, and in Socrates' dialogue with Cephalus at the beginning of Plato's *Republic*, Cephalus is made to declare that for moral and well-disposed old men age should be attended by few inconveniences. With the help of this and a few other expressions of opinion Stobæos even compiled a little anthology of aphorisms in praise of old age; drawn predominantly, however, from the works of the dramatists, in which, according to the character speaking, there are bound to be, here and there, references to the worth and dignity of old age. But in all independent utterances of opinion we find an unreserved expression of sheer lamentation over old age, and this often finds its way even into the drama. Here we must clearly distinguish between two different things: the dread of old age in itself, on account of its sufferings, and the evidently slight regard it enjoyed among the later Greeks—and the extraordinarily high estimation of youth. . . . Youth, it follows from this, is the only real age of the

Old Age

Greeks, and all life else is merely the most doubtful surplus. The elegiac poets, in particular, from the very first, from Mimnermus onwards, insisted on the exclusive value of youth. To be sure, if illness and grievous cares could be avoided, the poet of Kolophon would like to reach perhaps his sixtieth year, but with youth all true joys pass away, and this youth is only 'a cubit's span'; it lasts no longer than a dream, and so soon as youth is gone it were best to die; for what follows is the undermining of the home, poverty, the absence of posterity, sickness—in brief: there is no man born to whom Zeus does not send many evils. . . . Almost all these utterances mingle, even with the praise of youth, the Greek lamentations over old age, and many more complaints might be added. Those for whom the words of the poets are not sufficiently conclusive should read again the horrible parallel of youth and age in Aristotle; here the philosopher is discussing not merely the differing destiny of the two stages of life, but the human qualities of the young and those of the old; the former being predominantly well-disposed, while the latter are painted in the darkest colours; it is true, of course, that they are without hope, by reason of their many experiences; for whatsoever is, that is predominantly bad; and whatsoever happens, worse is to come. . . . In Sophocles it is said of old age: 'The understanding is quenched, what is done is unprofitable, and thereby griefs are vain.' In Euripides it is an old man who says: 'We aged ones are no more than a flock, a semblance, and we go our ways like the nocturnal images of dreams; understanding is in us no longer, however sagacious we think ourselves.' And long before this, in one of the Homeric hymns, Aphrodite declared: 'Even the gods hate old age.' In the above-mentioned dialogue with Socrates the greybeard Cephalus describes the complaints which his society of contemporaries are accustomed to make; above all they lament their present inability to enjoy the delights of youth, the loves, the banquets, and the like, and consider that such things were life itself, but that their present life is no life at

The Problem of Old Age in Other Civilizations

all; while some complain also of being spitefully used by their kinsfolk. Cephalus, on the other hand, holds that it makes for 'peace and freedom' that old age is quit of those stormy passions, and Sophocles also, with whom he has discussed the matter, has esteemed himself fortunate 'to have escaped a fierce and unruly tyrant.' But even greybeards were haunted by the love of life, and the venerable Epicharmos, when he sat in company with his aged masters in the Lesche, and heard that one would be content with another five years of life, and that for another three or four years would 'suffice,' took the liberty of saying that any debate of this kind was folly. 'All of us together, by reason of Destiny, are in our decline, and it is time we took our departure as quickly as may be, before we have to suffer yet more of the evils of old age.'

"One wonders why very old people should wish to go on living; and the centenarian Gorgias once had occasion to reply to an uncalled-for remark of this kind, that for the time being his age gave him no cause for complaint."

Like a modern echo of these Greek lamentations comes the complaint of Lord Byron: There is only one misfortune in life that cannot be repaired, and that is the misfortune of no longer being twenty-five years old.

Erich Schadewaldt, in a study of *Lebenszeit und Greisenalter im frühen Griechentum*, shows that the Ionian lyric poets made a special cult of the melancholy of old age.

"Alas and alas for youth, and for age, the all-destroying!

Age, that is ever approaching; youth that
turneth away! "

These verses from the maxims of Theognis are the most compact expression of the new mood which was finding utterance in the age of lyric poetry. The wistful praise of youth and the despairing abhorrence of age make themselves heard and are expressed in verse. The spokesman of the Ionian lyric in the debate over youth and age is Mimnermus, the poet of Ionian Colophon (*circa* 630 B.C.).

Old Age

He expressed the sorrowful burden of age in clear and unequivocal words: "Forever live the gods, knowing not age nor death. But we, like the leaves in the flowery season of spring, when swiftly they unfold in the rays of the sun, so for a space of time we rejoice in the blooms of youth, knowing naught of the good or evil fortune of the gods. Frowning dæmons stand beside us, one with the end of painful age in his hands; the other with the end of death. Brief is the time of the fruiting of youth, only the duration of a sunny day. But when this perfection of youth is overpast it were better to die then and there, than to live. For many grievous things befall the soul; the ruin of the home, poverty, death without children, sickness; and there is none of mankind to whom Zeus has not allotted abundance of evils."

Mimnermus describes the fundamental horror with which age is regarded. Malignant, ugly, contrary, misshapen, full of care, afflicted with poverty, sickness, dim-sighted and feeble-minded, enjoying no respect at home and unregarded in public; in this shape old age hangs like the stone of Tantalus over one's head; in this shape it slowly advances, while youth, after its brief span of life, departs forever. "What is life?" Mimnermus cries, "what is delectable, when one is far from golden Aphrodite? Dead would I be if this were vouchsafed me no longer: secret tenderness and flattering gifts and the couch, which are the delicious flowers of youth for men and women. But when lamentable age arrives, which makes the man uncomely and incapable, then evil cares gnaw even at the heart, and nevermore does it fill him with new life to behold the rays of the sun. Froward is he to children, and women he despises. So full of troubles hath Zeus rendered age."

Thus, youth alone is life; old age is worse than death. So Mimnermus asks for death at the age of sixty:

"So without sickness, so without torturing cares,
At threescore years may life ebb swiftly to death."

But these verses of Mimnermus were not to pass without

The Problem of Old Age in Other Civilizations

contradiction. No less a singer than Solon (640-560 B.C.), a younger contemporary of the poet, retorted thus:

“ If thou would'st give me hearing, erase the verses,
Bear me no grudge if my thought is better than
thine:

Alter a line, O master, and this be the reading:
At fourscore years may life ebb swiftly to death.”

Schadewaldt assumes that Solon was well over sixty when he wrote these verses. So, with playful deference, he proposes a revision of the line which advances the extreme limit of life by a couple of decades. The vigorous nature of Solon rebels against the weary listlessness of the Ionian poet. This is no isolated retort on the part of the statesman; it takes its place in the debate upon the Ionian view of life. The Athenian pleads for an active attitude to life, in flat opposition to the despondent resignation of Mimnermus. We find this new view of life in Solon's poem, which makes the course of human life amenable to the noblest and most perfect of all numbers, the 'world-controlling' Seven, and in concise and sententious aphorisms tells us what each stage of life brings to man, or takes away:

A boy at first is the man; unripe; then he casts
his teeth;

Milk-teeth befitting the child he sheds in his
seventh year.

Then, to his seven years God adding another seven,
Signs of approaching manhood show in the bud.

Still, in the third of the sevens his limbs are grow-
ing; his chin

Touched with a fleecy down, the bloom of the
cheeks is gone.

Now, in the fourth of the sevens ripen to greatest
completeness

The powers of the man, and his worth becomes
plain to see.

In the fifth he bethinks him that this is the season
for courting,

Old Age

Bethinks him that sons will preserve and continue
his line.

Now in the sixth his mind, ever open to virtue,
Broadens, and never inspires him to profitless
deeds;

Seven times seven, and eight; the tongue and the
mind

For fourteen years together are now at their best.

Still in the ninth is he able, but never so nimble

In speech and in wit as he was in the days of his
prime.

Who to the tenth has attained, and has lived to
complete it,

Has come to the time to depart on the ebb-tide of
Death.

Solon, in his poem of the ages of man, is content with seventy years. But in his rejoinder to Mimnermus he wishes to live to the age of eighty. We shall not find fault with him on that account. We see that meditations concerning the duration of human life always take on a personal note.

Schadewaldt sees, in the acknowledgment of age and death, a special greatness in the age of the lyric poets; Solon tells us in a moment how he looks at life. He does not ask what the individual can gain from life, or what he suffers from it. He shows us, in septennial stages, what the years bring and accomplish, and what the man, according to his age, can achieve. The Athenian lawgiver sees life as a great system, a great fulfilment. At the beginning and end of life are unripe childhood and exhausted old age. Between the two, with long ascent and swift decline, is a constant growth, that begins with the body and ends with the spirit, so that it twice reaches the summit, once of physical strength, once of intellectual capacity. Solon has emphasized this double culmination by twice using the same expression, in the same part of the line. And because his gaze rests in meditation upon the whole, and meditatively follows the growth of the whole, from stage to stage, Solon chooses the small units of

The Problem of Old Age in Other Civilizations

the septennial phase; not the popular division of life into three stages, and still less the antithesis of youth and age, which in the lyric poems covers the antithesis of yea and nay, enjoyment and renunciation, delight and fear. By this interpretation of life, perceived as a whole, he allows dignity and freedom to man confronted with the phenomenon of life. Beyond the flux of passing time, beyond the stream of delight and dread, he leads humanity back to that confidence in life in which the men of Homer's day lived and died. Yet this confidence, in Homer's poem, was the first-fruits, the early harvest, in the form of poetical action, of the still undivided spirit. In Solon it is the fruit of that profounder self-experience which the lyric form brought with it, inasmuch as men for a while lost themselves in its passion and its melancholy. Its personal experience of the iron law that doomed it to fade and perish was transmuted, by Solon, into comprehension of the law by which we grow and attain to completion.

Of himself Solon wrote, in his old age: "Never ceasing to learn, I still march onward in age." To old age also he granted its due rights. In so doing, perhaps, he gave the inner pretext for those disquisitions upon old age of the ethical philosophers, which first made their appearance at the beginning of the fourth century before Christ, and whose final precipitate appears in Cicero's essay *De Senectute*. This the Roman statesman wrote in the year 44 B.C., in the days of his exile, when he had leisure for such compositions. It is a positive *apologia*, a eulogy of senility, so that Montaigne was able to say of it: "Il donne appétit de vieillir."

The form in which Cicero has clothed his thought is the dialogue. Cato the elder, one of the greatest of Romans, who had died, at an advanced age, a hundred years before Cicero wrote his book, though his memory was still fresh and living in all men's minds, converses with Scipio, conqueror of Carthage, and Caius Laelius, the graceful orator and philosopher. Cicero was 63 when he wrote this book;

Old Age

and he allowed the 84-year old Cato to speak for old age. Cicero defended the proposition that the result of satiation with all one's favourite pursuits is that one is satiated with life itself. To the question, what did old men do? Cicero replied: "Did they do nothing when they defended the State with their counsel and their influence?" And again: "Not by physical force, not by bodily swiftness and agility are great things accomplished, but by deliberation, authority and judgment; qualities of which old age is not deprived, but with which it is, as a general thing, even more abundantly provided."

In many respects the description of old age given by Dante in his *Convivio* is related to that of Cicero. This book was written in the first decade of the fourteenth century, so that the description is worth noting as a mediæval testimonial to old age. Dante compares life with an arch, whose span is already determined in the germinal substance, and whose summit he places in the 35th year of life. Thus, the *Divina Commedia* begins with the famous line: "*Nel mezzo del cammin di nostra vita*"—whereby Dante indicates the 35th year of his own life, and also the beginning of the fourteenth century of the Christian era, as the starting-point of his journey.

As we have seen, he divides human life into childhood, youth, age, and old age. Childhood ends with the 25th year; youth with the 45th; age with the 70th. Anything beyond that he dismisses as old age. Dante describes for us the life of the ethical man, and his behaviour in the various phases of life. His aim is to promote morality rather than to give a psychological description. The moral man, in the years of his age, ought to be sagacious, upright, magnanimous and benevolent. As the full-blown rose opens and exhales its fragrance, so the old man should impart his virtues to those about him, and manifest a succourable nature. The moral man, in his old age, is likened to the sailor who in sight of land furls his sails and silently enters the harbour. He must draw in the sail of mundane cares,

The Problem of Old Age in Other Civilizations

and set all his thoughts and all his heart on God, in order to reach harbour as gently and peacefully as possible. Our inmost nature teaches us to enter into this peace, for then there is no sting, no bitterness in death. Poor and pitiful are those who would seek to run into this harbour with swelling sails; they will suffer shipwreck in the tempest, and perish at the end of their long voyage.

Having learnt something of the attitude to death characteristic of classic antiquity and the Middle Ages, we will now make a brief excursion into Biblical antiquity, another of the sources of our culture. Here we find the poetical description of age in the words of the preacher, Solomon (*Ecclesiastes* xii.). The author—in Hebrew he is called *Koheleth*, “the Teacher”—must have lived in the third century before Christ. A modern Jewish textual critic, Morris Jastrow, calls him a forerunner of Omar Khayyam and Heinrich Heine. In the text of the *Koheleth* the explanations of the metaphors given by Jastrow and others are included in brackets:

“Remember now thy Creator in the days of thy youth, while the evil days come not, nor the years draw nigh, when thou shalt say, I have no pleasure in them. While the sun, or the light, or the moon, or the stars, be not darkened (failing eyesight, and the decline of the intellectual powers), nor the clouds return after the rain. In the day when the keepers of the house shall tremble (the hands), and the strong men (the legs) shall bow themselves (become bent), and the grinders cease (the teeth) because they are few, and those that look out of the windows (the eyes) be darkened. And the doors shall be shut in the streets (digestive and urinary disorders), when the sound of the grinding is low (impaired hearing), and he shall rise up at the voice of the bird (insomnia, the early rising of the aged), and all the daughters of music shall be brought low (the failure or breaking of the voice); also when they shall be afraid of that which is high (shortness of breath upon going uphill), and fears shall be in the way, and the almond tree shall

Old Age

flourish (the whitening of the hair) and the grasshopper shall be a burden (the decline of the powers of procreation; in the Talmud the grasshopper is a phallic symbol), and desire shall fail; because man goeth to his long home; and the mourners go about the streets; or ever the silver cord be loosed (the curvature of the spine), or the golden bowl be broken (cardiac failure) or the pitcher broken at the fountain, or the wheel broken at the cistern (insufficiency of liver and kidneys): then shall the dust return to the earth as it was; and the spirit shall return unto God who gave it."

However, the Bible tells us of the frequent occurrence of centenarians in remote ages, and always represents these patriarchs as still completely able-bodied. We also find passages which may be interpreted as allusions to the instinct of natural death. Thus, the deaths of some of the patriarchs are recorded in the following manner: "And these are the days of the years of Abraham's life which he lived, an hundred threescore and fifteen years. Then Abraham gave up the ghost, and died in a good old age, an old man, and full of years; and was gathered to his people" (Genesis xxv. 7-8). "And the days of Isaac were an hundred and fourscore years. And Isaac gave up the ghost, and died, and was gathered to his people, being old, and full of days" (Genesis xxxv. 28-9). It is possible that the feeling represented by the words "full of days" is none other than the instinct of natural death. From certain passages of the Bible it appears that a long life was accounted a blessing: "For he is thy life, and the length of thy days, that thou mayest dwell in the land which the Lord swore unto thy fathers, to Abraham, to Isaac, and to Jacob, to give them" (Deut. xxx. 20). And "honour thy father and thy mother, that thy days may be long upon the land which the Lord thy God giveth thee" (Exodus xx. 12). And here one may mention a passage from the Psalms which says: "Those that be planted in the house of the Lord shall flourish in the courts of our God. They shall bring forth fruit in old age; they shall be fat and flourishing" (Psalm xcii. 13-14).

The Problem of Old Age in Other Civilizations

Pessimistic reflections concerning old age, not unlike the opinions of the Preacher, engrossed the founder of the Buddhistic religion, for which the recognition of the transitory nature of existence was the central experience, by which the whole view of life was affected. The legend tells us that Buddha, while he was yet Prince Siddartha, betrayed an inclination to forswear the world and follow a life of piety. In order to deter him from such a course his father had him educated in a magnificent castle, where he could enjoy all the good things of life, and where he would be protected from all painful impressions. In this environment he never saw an old man, nor a sick man, nor a corpse. But on several occasions the Prince escaped from his seclusion in order to make excursions into the outer world. On his first excursion he met on the highway a feeble, decrepit old man, whose body was covered with a network of swollen veins; his teeth were loose in his gums, the skin of his body was wrinkled, his hair was grey; his back was bent, and he leaned dejectedly on a staff; his youth was fled, his throat uttered only unintelligible sounds, and he trembled in every limb. When the Prince had learned from his coachman that this was an old man, and that in all living creatures youth was followed by age, this made such an impression on him that he said to his coachman: "What a misfortune for those weak, ignorant creatures, whose understanding, intoxicated with the pride of youth, does not perceive old age! What do sports and rejoicings mean to me, since I am but the dwelling of the age that is to come!" On another occasion Prince Siddartha found by the roadside a man sick of a fever, who was breathing only with difficulty. When the coachman told him that this was a sick man, he cried: "So health is like the juggling of a dream! And the dread of sickness also has this frightful form! Where is the sage who after beholding such a fate could still be capable of joy and happiness?" Some time after this Siddartha made a third excursion. Then he beheld a dead man, covered with a shroud, surrounded by his relatives,

Old Age

who were weeping and lamenting. Deeply moved, the Prince cried: "Oh, miserable is the lot of youth, which is undimmed by age! Miserable is human life, which endures for so brief a span! Woe for the enticements of lust, which seduce the heart of the sage!"

While the aim of Buddhism is, to a certain extent, flight from the world, the doctrine of Confucius inculcates a thoroughly affirmative attitude to life, and therefore to the old: indeed, one may say that the Chinese honour nothing so much as old age. The Chinese author Lin Yutang, whose books afford us a profound insight into the life and thought of his countrymen, says, in relation to this attitude, that he has often endeavoured to compare the Western and Eastern attitudes to life, and to grasp their contradictions; but he has found no actual difference, except in the attitude to old people, where the difference is indeed unmistakable, and uncompromising. In the very earliest times we find in the mind of the Chinese people a feeling for the kindly and considerate treatment of old age. It is a feeling which can be compared only with the chivalry which in Europe took for granted a delicate consideration for women. But in the attitude toward the aged the difference is insuperable, East and West taking totally different points of view. This is most evident when it comes to asking any one his age, or telling one's own. In China, when one pays an official call, the query as to one's name and family name is followed at once by the question: "And what is your honourable age?" If the person so interrogated confesses, with hesitation, that he is three and twenty, or eight and twenty years old, the other consoles him with the comment that he still has an honourable future before him, and one day, of course, he will be old; but if the person questioned can reply that he is thirty-five or thirty-eight, the other at once exclaims in a most respectful tone: "Great good fortune!" The enthusiasm increases in proportion to the age which the person questioned has to admit, and if he is over fifty the questioner at once lowers his voice in deference and respect.

Tintoretto (Jacopo Robusti) 1515-94

- IV. The Marriage in Cana 1561 (Venice, Santa Maria della Salute)
The work of the 43-year-old painter
- V. The Last Supper 1591-4 (Venice, San Trovaso)
The work of the 75-year-old painter. See page 165





The Problem of Old Age in Other Civilizations

For this reason all old people who can do so should really go to China, where even the white-bearded beggar is treated with perfect consideration. People of middle age wait most eagerly for their fiftieth birthday, and successful merchants and officials have been known to celebrate even their fortieth birthday with the greatest pomp. But the fiftieth birthday, the milestone of the half-century, is in all classes of the community an occasion for boisterous rejoicing. The sixtieth exceeds the fiftieth in excellence, the seventieth the sixtieth, and he who can celebrate his eightieth birthday is regarded as an especial favourite of heaven.

The importance of being old, or at least of seeming old, is readily understood when we consider what an advantage age enjoys in every respect in China. To begin with, it is the privilege of old people that they can speak while the young have to listen and hold their tongues. "A young man should have ears and no mouth," says a Chinese proverb. The man of twenty should listen while the man of thirty is speaking, and he, on the other hand, is expected to listen in silence when men of forty are conversing. Since the craving to speak and to have listeners is universal, it is evident that with increasing age one has things more and more one's own way. It is a round game in which no one is unduly favoured, for every one has the prospect of being as old as the rest when his time comes. . . . As the only basis of the philosophy which cultivates the veneration of their aged parents, the Chinese adduce the sense of gratitude. What one owes to one's friends can perhaps be counted, item by item, but the gratitude owed to parents defies calculation.

The veneration of age in China has its roots, as Erwin Rousselle, the Frankfort sinologist, has shown, in religion and mysticism. While Confucianism enjoins the veneration of the aged as an ethical requirement, the mysticism of the Chinese, or Taoism, reserves for the aged the ultimate spiritual intuition. Lao-Tse, the founder of Taoism, was born in the year 604 before the beginning of our era. The myth tells us that he was the child of the sunlight and a peasant

Old Age

maiden. The newly-born child had snow-white hair and snow-white eyebrows, and was as white as other mortals are at the age of eighty. For this reason they called him Lao-Tse, which means the Old Son. The Taoist Way of Salvation follows the circle of Light, Renunciation and Awakening; there follows the death of the ordinary human being, the Transformation; which is followed by the growth of the new, immortal being, who enters into a state of perfection, informed with the ancient wisdom and the sense of eternity. In order to reach this last stage he must pass through a 'backward movement' of the germs of vitality. The germs of vitality are hoarded up and change into life-giving breath. What a man wins in wisdom he loses in passion. The instinctive urges are sublimated and made to serve higher aims and intentions. In this connexion asceticism is a valuable aid. But asceticism should be followed without any compulsion. It is a preliminary condition of this stage that the pupil must have passed the middle of life; that is, he must be about forty years of age. In China, in all periods, there has been an especially intense realization of the deeper processes of life. Even the attainment of spiritual enlightenment, the "being above things," the stage of ripe humanity, and the ancient wisdom are natural attributes of old age. To the man of forty, or thereabouts, is communicated the meditation upon the regressive movement; only when he is sixty does he devote himself wholly to the "Tao of Heaven." The various stages are reached by a definite technique of meditation, in which, as Rousselle tells us, it is of fundamental importance that he who has passed the mid-point of life should succeed in feeling the "death of the natural man" as a terrible experience; only so is the transition to the full type of the enlightened and supremely ripe human being possible; a truly significant, organic growth to ripeness, without distractions, and—having regard to the shortness of life—without regrettable losses due to unprofitable years.

The Chinese veneration of age, rooted in mysticism,

The Problem of Old Age in Other Civilizations

reminds one of the "patriarchs" of the Russian monasteries, of whom Dostoievski tells in "The Brothers Karamazov":

"What is an 'ancient' actually? An 'ancient'—he is one who takes stock of our souls and our wills. If we have chosen an 'ancient' we have resigned our will and given ourselves to him in perfect self-renunciation. This test, this terrible school of life, he takes upon himself who makes this vow. Of his own free will, in the hope of conquering himself after protracted examination, of subduing himself to such an extent that he is able at length, by the obedience of his whole life, to attain perfect freedom, which means, freedom from oneself; in order to avoid the fate of those who live their whole lives without ever finding themselves. This institution of the 'ancient' is not a theoretical institution; on the contrary, in the East it has been derived from a practice which is now thousands of years old. The obligation, in respect of the 'ancient,' is not what is commonly called obedience; that has always existed, even in our Russian monasteries. It is rather an endless confession submitted by all those who have surrendered themselves to the 'ancient,' and an indestructible bond between the binder and the bound. . . . So in certain cases the 'ancients' are possessed of unlimited and unfathomable power. . . . To the ancients of our monastery the simplest as well as the most distinguished people came flocking, in order to bow before them, in order to confess their doubt, their sins, their sorrows, and to beg for advice and instruction."

In the *Teachings and Sayings of the Ancient Sosima*, Dostoievski has expressed the most profound and beautiful things concerning the education of the child. Hardly anywhere else has the common destiny of youth and age been more impressively described.

THE COMMUNITY AND THE PROBLEM OF THE GENERATIONS

WHEN we come to consider the position of the aged in the community, and the problem of the generations, we turn our attention first of all to the primitive peoples among whom the social structure and human relations are still simple and easily observed. Quite generally, it may be said that primitive peoples hardly know what to do with their old people; for the most part they are felt to be a superfluous burden. Sir James Frazer tells us how among the Fiji Islanders the old people prefer to kill themselves. This custom is connected with their conception of the future world; they believe that human beings enter Elysium in the physical and mental state which was theirs at the moment of death. No wonder that they prefer to make the transition into the other world at a time of life when their mental and physical powers are not yet weakened, and when they are still capable of enjoyment. It must be added that among warlike peoples physical weakness is regarded with contempt, so that the aged, who are no longer capable of defending themselves, have to suffer contumely and disdain. Thus, when a man of advanced years perceives that his strength is failing, and feels that he is no longer equal to the demands of life, and fears that he might not be able to share in the delights of the future life with undiminished powers of enjoyment, he calls his family together, and explains to them that he regards himself as worn out and superfluous, and liable to become an object of contempt; for which reason the time has come for him to be buried. The family council then decides upon the day and the hour for the living burial of the old man.

This custom is by no means peculiar to the Fijian people; similar practices have been reported among other primitive peoples in all parts of the globe. Among the Indians of the Gran Chaco the old man requires his son, as a service of love, to strike him dead as soon as he proves no longer capable of the utmost physical exertion, lest he should become a danger

The Community and the Problem of the Generations

to the wandering tribe. In the Gran Chaco only life in the full vigour of youth can survive.

We learn from Procopius, the Byzantine historian, that among the Herulians, an ancient German tribe, it was the custom to kill the aged and the sick at their own request. Julius Cæsar mentions a similar custom among the Gaulish peoples. For that matter, the early Romans had the same attitude to age; old and sick people of whom they were weary, and who may themselves have been tired of life, were put to death out of compassion. In the old Roman cry: "The men of sixty *ad pontem*"—to the bridge—contains an echo of the custom of summarily drowning old and worn-out people. For this reason aged senators were briefly described as *Depontani*. Heinrich Schurtz has pointed to the fact that it is not the number of his years that draws upon the old man the antipathy of his fellow-tribesmen and kinsfolk, but his weakness and helplessness; as long as he is robust and active, and capable of working and fighting, he has little need to worry. Old people, therefore, will desire to justify their existence. This desire is responsible for certain forms of the industrial division of labour. Old people can do such light work as the weaving of mats and baskets, carving wooden vessels and implements; and so, as an age-group, they may at the same time form an industrial caste.

In certain ancient peoples the care of the aged chief was special one. Chieftains, we learn from Sir James Frazer, are revered as the incarnation of divinity. But such chieftains must not grow old; so as soon as age and infirmity make their appearance they are put to death by their subjects. The soul of such a chieftain then enters into an able-bodied successor before it has suffered through the decay of the body. Some tribes insisted that they must be ruled only by perfectly sound and healthy chieftains. It seemed to them extremely dangerous to wait until the chief betrayed the signs of old age; so they preferred to bring his career to a close while he was still in the prime of life. A definite term was fixed for the rule of a chief, of such a length that there

Old Age

would almost assuredly be no need to fear age and infirmity. It is hardly to be wondered at that many chieftains did not approve of this custom. Since the chieftains were also magicians, a way out of the difficulty was soon discovered; the ruler appointed one of his subjects to die at the end of the term.

In comparison with these conditions the Council of Elders must be counted as a first step toward a better organization of the life of the community.

In the dawn of human history the hunters and warriors would wield the decisive influence in natural societies. These avocations required, in the first place, strong muscles and keen senses; so that those who followed them would belong chiefly to the younger and median age-groups. But in the course of time the representatives of tough old age would win respect and achieve significance, as the forces of experience and practical wisdom embodied in them, and especially the memory of important events and traditional usages, would be more and more highly valued. Sometimes this degree of insight is achieved in quite a primitive stage of society. The Australian Bushmen are ruled, neither by chieftains nor by kings, but by an oligarchy of influential elders; and the aged are treated by them with great respect. Again, among the Krumen of West Africa it is the ancients who exercise political power.

We find also that the council of elders was known to classical antiquity. In Sparta, according to the constitution of Lycurgus, the power of government was apportioned to three instances: firstly, to the Lacædemonian kings; then to the five overseers or Ephors; and finally to the Gerousia, the Council of Gerontes, or Elders. This consisted of twenty-eight men over sixty years of age, who had given proof of their quality and who were elected to office by popular acclamation. The Council of Gerontes exercised judicial functions; above all, it had the right to deliberate beforehand upon the resolutions of the people and, apparently, to cancel resolutions. Its power, however, was restricted, as

The Community and the Problem of the Generations

it could not choose its own presidents; the presidency was always allotted to one of the kings. Both kings were members of the Council. A further restriction consisted in the fact that the Gerontes could not assemble unless they were convened by the Ephors. Thus, one power was always restricted by the others. This cleverly devised mixture of powers, which gave each age-class its competence and responsibility, but also its restrictions, made the Lycurgian constitution one of the most admirable phenomena of history. In Sparta the experienced wisdom and judgment of the old enjoyed peculiar esteem; but the lawgiver endeavoured to prevent the exclusive rule of the aged by assuring the representatives of youth and maturity of a corresponding influence in political affairs. It may well be that the Lycurgian constitution gave rise to the Greek proverb: "Only in Sparta is it good to grow old!"

But in ancient Athens also the old enjoyed special esteem; and there, in public conferences, the men of fifty were first called upon to speak. It was the same in the early Roman State; the oldest of traditions took an assembly of elders for granted; for that is the meaning of the word *Senatus*. On the other hand, in the Roman Empire the youthful rulers appear to predominate.

The same thing is true of the German Emperors in the Middle Ages. Now, it is an interesting fact that the German Emperors were opposed by a power, as counterweight, which was essentially represented by old men: the Papacy, which may indeed be described as the most decided form of gerontocracy. The exclusive selection of the Popes from the College of Cardinals ensured that, as a general thing, only mature personalities could attain to this highest of dignities. It is true that many exceptions are recorded by the early history of the Church; nevertheless, the gerontocratic character of the Papacy is undeniable. The conflict between Emperor and Pope was very often an expression of the contrast between youth and age. The average age of the Salic and Hohenstaufish Emperors, who were so often in conflict

Old Age

with the Papacy, was 43 years. It may be remembered, for example, that at Canossa the 26-year old Henry IV confronted the 53-year old Pope Gregory. It would be interesting and suggestive to consider history, for once, from the standpoint of the relative ages of the prominent actors. Even to this day the Roman Curia is composed of old men. Consider the respective ages of the participants in the Council of Rome, in the year 1870. According to J. Finot, out of 766 prelates 316 were more than sixty years of age, and 25 were over eighty. The Sacred College of 1941 offered a similar picture: the doyen of the Cardinals, Mgr. Granito Pignatelli of Belmonte, was more than ninety years of age. Five more of their Eminences were over eighty, 13 were over seventy, 26 more than sixty, and 8 under sixty.

As a little psychological comment one may here interpolate a passage from C. F. Meyer's *Die Versuchung des Pescara*; it shows the danger to which aged men are exposed as the rulers of States: "Pope Clement, out of senile excess of cunning, failed to seize upon the critical moment. To change the metaphor, he sharpened the pencil until, to his annoyance, the too fine point broke off."

Besides the Papacy, we may mention another State which was governed by a gerontocracy: the Venetian Republic. Any one who passes in review the portraits of the Doges of Venice will be struck by the many aged faces among them; and in fact a glance at the history of the Republic tells us that by preference old and experienced men were elected, especially in critical times, for the highest office. We find a typical example in the year 1192, when Venice was threatened, to her great peril, by the youthful Emperor Henry VI: "At this moment only such a man could ascend to the summit of the State as combined courage, resolution and vigorous action with the qualities of a true leader. In the judgment of all this man was the octogenarian, half-blind Enrico Dandolo. He was chosen by the unanimous votes of the electoral college; he was joyfully acclaimed by

The Community and the Problem of the Generations

the people; he enjoyed the general confidence. Beside the youthful Emperor Henry VI, with his world-embracing imagination, his will to power, and his diplomatic genius, appeared an aged man who by all human calculations was standing on the brink of the grave, a man equally ruthless and desirous of fame, and no less shrewd, no less able" (Fritz Schillmann). Dandolo's government was a succession of the boldest political and military enterprises. First he diverted the Fourth Crusade, converting it into a predatory incursion, to the advantage of Venice; the Crusaders, instead of conquering the Holy Land for Christendom, conquered Dalmatia and Byzantium for Venice. Dandolo himself, at the age of ninety-three, led the assault upon Byzantium. But after this achievement he was by no means willing to quit the scene of his triumph. In the year 1205 he once more flung himself into the battle when the savage Bulgarians assailed Byzantium. He died from the effects of a serious wound.

In later years the office of Doge was often assumed by old men. In the year 1354 Marino Falieri was elected Doge at the age of seventy-six. "The choice fell upon him because it was believed that in the difficult position in which the Republic found itself he would prove a shrewd and capable head of the government" (Fritz Schillmann). He was followed by Giovanni Gradenigo, who was also seventy-six years of age. Later still we find the octogenarian Cornaro on the ducal throne. It was reserved for his successor, the aged Andrea Contarini, to liberate Venice from the danger of conquest by the Genoese, who had already seized the neighbouring city of Chioggia.

The example of Venice affords impressive evidence of the biologically interesting capacity for work of the aged; and such instances could be multiplied *ad lib.* by examples from other times and other countries. Theodor Mommsen said in 1875: "Only over an application of the principle that a man needs old age in order to fulfil his purpose do I linger yet a moment, because it is the highest application of all! I

Old Age.

mean its application to the statesman. This, the most important of all activities, is also that for whose beneficent fulfilment, for whose enduring success, the continuance of our personality is most desirable." In writing this Mommsen may well have been thinking of his own fatherland, at whose head were then the eighty-seven year old Kaiser, the sexagenarian Bismarck, the seventy-five year old chief of the General Staff, Moltke, and the seventy-two year old War Minister, Roon. Let us remember that Talleyrand was sixty when he was responsible for the Peace of Paris in 1814; a Peace of which it was said: "Could one, after a war so completely lost, win the peace better?" "*C'est le moment où l'oiseau déploie tout son plumage.*" So the biographer of Talleyrand wrote of this episode of his life.

Consideration of the Papacy and of Venice seems, however, to teach us something further. Both these forms of State had a particular style, and this style has indubitably certain traces of decrepitude. We shall have something to say also as to the style of the Old Masters in their later years. In both we find an excessive degree of experience, of history, of conclusiveness, almost of petrefaction.

Just as political structures and national communities have their style, so individual generations have their distinguishing characteristics. According to Wilhelm Pinder the historical situation is variously coloured, accordingly as young men, or men of middle years, or old men have had the most influential voices. Each stage of life conceives the tasks which life sets it in a different form; a form often so different that they seem almost like different tasks. At all events, we shall have a better and clearer understanding of a period if we begin by noting the age of its influential men.

Jacob Burckhardt speaks of the ageing of the life of antiquity and its culture, of an evening twilight of the heathen world. He cites utterances of that epoch which sound like transferences of personal experiences of the phenomena of age to the whole contemporary situation. "By the notion of ageing we do not mean to imply the

The Community and the Problem of the Generations

impossibility of further life, but only the gradual drying up of those springs of life which once conferred upon the nation its nobler spiritual and physical character. It seemed to the men of the Roman Empire that the rivers were growing shallower and the mountains lower; at sea Etna was not visible from so great a distance as before, and the same thing was said of Parnassus and Olympus."

Sir James Frazer has shown, giving examples, that the majority of nations and tribes which are ruled by old men lead a peaceful existence, and that under such conditions the individual usually fares well enough; so that posterity is apt to praise such a period as the Golden Age. But movement in human history calls for individuals of the greatest perspicacity, and of unrelenting character. The wise, prudent counsel of elders, who advise caution, is commonly rejected by youthful adventurers. A hitherto peaceful tribe suddenly awakes to life; it falls upon its weaker neighbours and increases its power and its prestige. In ancient times this process was favourable to social and intellectual evolution. Thus, we see the opposition and the conflict of the generations in a new light. The mutation of historical epochs, with their differing styles of life, has evidently its significance in the life of the nations, and it seems as though periods of youthful governance alternate with periods characterized by a preponderance of the aged. The transition from one period to another is often accompanied by great upheavals. Revolutions are made by youth. The truth of this statement is shown by the fact that reaction often restores the ripe and aged elements to power. In the French Revolution this tendency was already apparent in the Constitution of 1795, which introduced a minimum age-limit for the members of the two legislative bodies. For the members of the Council of Ancients the minimum age was forty, and for the Council of the Five Hundred, thirty years.

This tendency first found its full expression after the fall of Napoleon; it found eloquent expression in a speech delivered in 1821 by the sixty-seven year old Talleyrand

Old Age

(1759-1838) in the Chamber of Peers: "Let us pray that we may long retain the old men whom we still have in this Chamber; they belong to times of which they are the only relics. Their presence is a continual warning: they tell us to conduct our affairs without haste (*de mettre du temps dans les affaires*), to observe propriety with discernment, and to appreciate without illusion all aspects of life. In the course of their long journey all the sanctuaries of the human mind have been opened to them, and in them they have learned the science of the useful truths, the science which sets a just valuation on both the resistance of habit and the enterprises of the imagination."

Some have attempted to explain historical development as a pendulum movement, in which each new generation asserts itself in opposition to its predecessor. In that case the only relation in which the succeeding generation can stand to its predecessor would be that of antithesis: it would deny what was sacred to its elders, and affirm what was anathema to them (J. Petersen). But the rhythm of historical events is not so simple. The generations are not superimposed like a stack of tiles; they present, in their implication, not a juxtaposition, a succession, a superimposition, but an infinite interpenetration. The natural law of the succession of the generations is complicated when succession coincides with the transition from one epoch of civilization to another.

Before we proceed to consider the relation between age and youth in our own day, we must acquaint ourselves with a phenomenon which is of great significance under our present circumstances: namely, the division of the community into age-groups or classes. Here again anthropology offers us valuable data, since in the case of primitive peoples these relations are incomparably simpler and more evident. Driberg has pointed to the fact that primitive peoples are sharply divided in a vertical sense, and broken up into families and tribes; that is their weakness. It is the horizontal incorporation of individuals in age-groups which

The Community and the Problem of the Generations

reinforces tribal membership and unites the tribe. We find such incorporation occurring in times of peril, as a temporary and conditional arrangement or, in certain tribes, as a permanent institution. The population is composed of confederations or alliances of different age-groups. The best known and most carefully studied example is the tribal organization of the Galla and the Masai, the warlike Nilo-Hamitic pastoral peoples of East Africa. Here is a brief summary of what Heinrich Schurtz tells us of these peoples: The boys, at the age of puberty, on the performance of certain rites of initiation, are received into the tribal community, which, in a certain sense, is contradistinguished from the family and the kindred (*Sippe*). With increasing years the members of the tribe automatically move into a higher grade. Each grade has its own functions, with corresponding ceremonies and insignia. In the highest grade the members retire from the active life of the tribe and assume the passive role of elder. Before the initiation at puberty, and before entry into a higher grade, the candidates are given a course of "political" instruction in tribal duties and obligations, and tribal history, and in matters relating to hunting, war, and sex; in short, in all the problems of individual and social life. The young tribesmen are trained for their tasks in their respective age-classes by exposing them to danger and privation. Among the Galla the oldest group takes over the leadership of the tribe for a time, before entering into retirement. After the age of sixty the Galla withdraws from political activities and makes way for the younger ranks of his family group. In retirement he bears the title of Akakaju (Grandfather of the Country) and as such he is still competent to advise the younger Aju.

Precisely because the tribal arrangements of primitive life here described are so simple, their fundamental features are more clearly perceptible, and may well give us a valuable insight into the far more complicated and confused circumstances of our present world. Evidently an opposition exists between the vertical powers, family and kin, and the horizontal political community.

THE OLD GENERATION AND THE YOUNG

WHAT is the mutual attitude of old and young? What forms does the conflict of the generations assume to-day? To answer these questions is almost impossible for contemporaries, since their view is lacking in perspective. In order to show how greatly and how rapidly the psychological situation as regards the attitude of the generations to one another, and the positions of the generations themselves, have changed, let us consider only a few instances, which seem to us typical, from the last few decades. The response and understanding which these instances evoke in us to-day will enable us, better than anything else, to realize that the mutual relations of old and young are in a state of flux.

In 1916 the English psychologist W. Trotter observed, in his book on the *Instincts of the Herd in Peace and War*—a work very highly regarded at the time—that the attitude of the adult and the old man to youthful enthusiasm was so uniform, indeed stereotyped, that it must appear a commonplace to the psychologist. The young hotspur who, of course, has at least as much justification as the elderly conservative, has always to listen to the same comment from the latter: that he too, in his youth, had pursued the same aims, with the same zeal and the same hopes, until experience taught him wisdom: “As it will you, my boy, when you have reached my age.” Do we not hear, in such assertions, the tragic jealousy of dwindling eminence? The herd instinct, which is infallibly on the side of the majority and the ruling powers, always throws the weight of its influence into the scale of age, and agrees with the verdicts of history, with proverbs, with traditional customs; and the wisdom of primeval ages is opposed to the self-confidence and enterprise of youth. Any comprehensive survey of our modern civilized world shows how everywhere a disproportionate influence is at work which has been acquired merely by virtue of old age. Preference is given to old judges, old barristers, old politicians, old physicians, old generals, and if

The Old Generation and the Young

their tasks call for rapid decisions we willingly pay the price for the mistakes which these ripe spirits, thanks to the failure of their energies, only too often commit.

A retrospective survey of the problem of German youth before the war, which was published in 1935, offers us a similar picture:

"Formerly, at school, it would often make us hot with rage when a grey-haired schoolmaster benevolently but decidedly challenged and rejected our own opinions with the stereotyped phrase about 'fermenting wine!' You are young—it was implied—and your fine enthusiasm does you credit, but your ideas are unripe, for you are still without experience. We felt as if someone were slamming the door in our faces, as though we could hear a rusty key turning in the lock; well, just wait until what's inside there has fermented, and then one will see whether one can open the door again. For a time we drummed angrily on the door; then came resignation" (Frankfurter Zeitung, 12 July 1935, No. 352).

A striking description of the psychological situation of the period is given by Prince Karl Anton von Rohan:

"If the bourgeois was inclined to overvalue age, the anti-bourgeois is undoubtedly a victim of the prejudice which overvalues youth. But here again, in the lower strata of the soul, a remarkable wave-movement seems to be running through the symbolism of defence. While before the war only grey-haired and white-haired men succeeded in reaching the higher commands, at the same time such an attitude toward life was becoming general that the period was justly described as 'The Age of the Child.' Everything for the Child! It appeared as though humanity, in its collective subconscious, had a foreboding of the approaching collapse of civilization. To-day we are living in the age of the young man and the young woman—by no means, however, the virgin. The most elderly men seek to manifest their youthfulness by indulging in sport, and on the floor of every dance hall or ballroom there are elderly matrons and old men

Old Age

competing with youth. . . . Even thirty years ago a married woman of thirty-five, after the birth of her second or third child, was a dignified matron. To-day a sprightly sexagenarian would feel insulted if her juniors were to treat her as though she were anywhere near as old as the woman of thirty-five was then . . . ”

It is only on reading such statements that we actually realize how far we have travelled during the last few years, and how remote the time already seems to which these passages bear witness. The revolution was initiated by the so-called Youth Movement. Just in the beginning the problem of the generations was vigorously discussed, and the contrasts between old and young were violently emphasized. The tendency to overvalue old age, as it exists in peaceful times, was followed by a prejudiced overvaluation of youth. Even at school, and elsewhere, the new youth became conscious of its own youthfulness and its own individuality. Youth appeared to it not as a phase of becoming, not as unripeness, not as a defect, but as a positive value. It began to cherish the firm conviction that the spirit of youth could solve problems and bring about historical transformations for which “the old” had neither energy nor initiative. While formerly the schoolmaster had insisted on the dignity of age, and the value of its experience, thereby inciting the young to futile opposition, now youth entrenched itself behind its exaggerated self-assessment. Youth is no longer willing to be led by the old, having once been presented with the slogan of self-guidance. Ernst Robert Curtius describes the situation obtaining in 1929 as follows: “We are passing through a psychic revolution of the sons against the fathers, a false fixation on an illusory youth, an evasion of the spiritual demands of ripe old age.”

Here one recalls the familiar words of the Baccalaureate in *Faust*, which may be rendered thus:

“Experienced wisdom! Froth and dust!
No compeer of the ready wit!
Time-tested knowledge?—why, there’s just
No earthly sense in knowing it!”

The Old Generation and the Young

These words expressed a phase of development of the individual man. To-day they characterize the mood of a whole generation. Generally speaking, behind all these protests is concealed the inability to attribute the appropriate significance to the established stages of human life. But they may also express a simple reaction against the fact, to which many references have already been made, that owing to the progress of medicine the average duration of life, and the numbers of elderly persons, have undergone an extraordinary increase, so that the rising generation finds that those leading positions which used more frequently to become vacant through the death of their occupants are filled for some time to come. As a consequence of this movement we see a lack of understanding between the generations; the prestige and importance of age is diminished, and rigid maximum age-limits are established in public life and in the business world.

At the same time, youth has manifested a tendency to close its ranks, to segregate itself. And in so doing it incurs the danger of fencing itself away from the field of real achievements, and of falling a victim to the intellectual narrowness which it has so long derided in the person of the philistine. In our age of dissolution, as Karl Jaspers has said, a false weight is attributed to youth, and it is doomed to failure, because the human being, if he is to become a man, must grow through the succeeding decades, and must be trained unrelentingly step by step.

It is a significant fact that parallel with the self-segregation of youth—that is, with a movement which was directed as much against the old as against the family—there came an increasing absorption by the State of the private life, and a greater intervention of the State in provinces which were formerly reserved for the family.

It has already been observed that according to the anthropologists the age-group stands in a certain sense in opposition to the family. Further, it has been noted that it is precisely the warlike tribes of the Galla and the Masai who have

Old Age

organized themselves in age-classes, which are trained for warlike purposes. This institution of age-classes is plainly an effective instrument for the development of political power. It is significant of our warlike epoch that it is more particularly in the great States that the population, and above all the youth of the nation, is organized in age-classes.

We are, of course, well aware that these suggestions are fragmentary, and also, perhaps, exaggerated. Such general valuations have always a certain arbitrary character. In order to deal faithfully with the problem as a whole one must consider it in its historical setting, whereas in these pages it must seem unduly divorced from the external context.

While fully aware of these restrictions and reservations, we should like to proceed a little farther. We believe it possible to register certain symptoms of an undulatory movement whose direction is the contrary of that above described. Such symptoms, if we are correctly informed, have quite recently been observed in North America, that is, in a country which is ordinarily regarded as a typical arena for the exclusively youthful and unwearied spirit of enterprise. This picture is apparently no longer accurate, since conditions have greatly changed. The age of the youthful pioneers, who pushed their way to the Pacific shore, is past forever. For the fulfilment of their mission muscular strength, and adventurous spirit, and energy were necessary. The America of to-day has new tasks for its citizens, which have to be carried out by men with different qualities. Vitality and the spirit of enterprise must be turned inwards. No later than 1914 the American philosopher Frank Crane published a noteworthy criticism of the unbalanced intellectual attitude of youth. Under the title *The Old are the Progressive*, he wrote as follows: "It is not the young, but the old who are individualists. For the first years of a man's life his thoughts run in the grooves of his teaching. All ideas are new and strange to him, even the world-worn platitudes. . . . In the realm of intellect young people are

The Old Generation and the Young

older than old people; for the young think in the formulas of yesterday, and it is only as we grow old that we begin to challenge and question words. . . . Contrary to the common notion, it is old and not young men who furnish us with heretics, freethinkers and modernists. For all these are born of doubt, and doubt is a distinct product of experience, and hence comes with age, just as faith is 'the substance of things hoped for,' and so the property of youth. The hope of progress lies in old men. If human life terminated as a rule at twenty-five the whole world would remain as fixed and bound in its old institutions as China." The young thinker, as Ed. Sprenger has shown, often gives his adherence, from unconscious motives, to *one* master, whose intellectual world has most to offer him personally. He is liable to remain for years under the spell of this master, withdrawing himself, as though in self-protection, from other lines of thought, toward which his attitude is hostile and contemptuous.

In order to arrive at a better understanding of the problem of the generations, we will touch upon its individual psychological facet. The thinkers of classical antiquity had already applied themselves to this most ancient of human problems. It found its classic expression in the tragedy of the nonagenarian poet Sophocles: *King Œdipus*. The neurologist E. Speer has given an interpretation of this tragedy which for us is full of significance:

"The whole argument," he writes, "takes place, in accordance with its historical period, only between the men; i.e., between father and son, and between the sons. The women, in respect of the action, have subsidiary roles. The old man and the young meet in a sunken road, travelling in opposite directions. A violent encounter is inevitable; there is no room for two to pass on the narrow road. The young man is the victor. His path lies over the dead body of the old man. Œdipus then takes the place of the old man—but only when he has rightly guessed the riddle of life (which the Sphinx propounds to him). In every respect he takes the

place of the old man, even with his wife; it is, indeed, by taking his wife that he enters into possession of his kingdom. This proceeds from the circumstance that Creon, who assumed the reins of government after the death of Laios, announced that he who should rid the city of the Sphinx should receive the kingly crown and the hand of the widowed queen. Œdipus himself will be succeeded by his sons, under circumstances which cause him to desire their death, and this in the cruel form of mutual fratricide. In that Œdipus desires the death of his sons he is doing no more than his father Laios did to him, by wounding his foot and exposing him on Cithæron. It is true that Laios was warned against this son by the Delphic oracle. But this 'prophecy' is no more than the traditional formulation of the ancient wisdom, according to which every son is a menace to every father—just as every father is a menace to the son.

"This destiny could have assumed another form—as the legend shows plainly enough—if certain things had happened otherwise. For example, if Œdipus had actually known his real father. The father whom he was bound to regard as his own—namely, Polybos of Corinth—he avoids by self-banishment.

"The father whom he kills he does not know. We see, then, that it is only if the father and son know nothing of each other that the supreme and grievous catastrophe occurs. Hence the high valuation set upon genuine friendship between father and son; only such friendship can avert disaster. To know one another is the first preliminary to understanding. But without understanding there can be no union among mankind, no affection, no reconciling love.

"I picture to myself what happened in this case with the help of an example of static pressure: Just as to the son, growing upwards, the best of fathers may be felt as a downward pressure, so the father is conscious of the growing son as a future menace. This is not always immediately perceived, but it is perfectly obvious when the circumstances are such that the son is already to all appearance destined

The Old Generation and the Young

to succeed to the father. Of this the history of the crowned heads offers abundant evidence; in everyday life it is seen most clearly in the relation of the manufacturer to his son. Just as the son of the factory-owner feels deprived of the rights of succession if his father persists in excluding him from the leading position, so the factory-owner feels himself threatened with dethronement as the claim of the grown-up son seems to demand the father's abdication with ever-increasing urgency."

This description reveals, to a certain extent, the approach to a solution of the problem. The lack of mutual understanding between father and son has a profound reason: The father seems to speak the same language, with the same accents, as the child; but what he says comprises the experience of a whole lifetime. Only friendship between father and son, understanding between youth and age, can bridge over the contradictions. It is the great task of the mature human being to show the young, in the midst of their difficulties, that there is always a way out of them. The bitterness and discussion to be observed in so many families compels us to look for a solution which will enable the elders to find lasting satisfaction and compensation without embittering and stunting the life of the child and the youth. For the old, understanding does not mean that they must regard age as a defect, indeed, as a misfortune, and so shut themselves away from youth. At the same time, it is unthinkable that the autonomy of youth will avert the conflict. The segregation of the age-classes is an atavic phenomenon, which cannot in any case be accepted as a pattern by modern society; for all self-segregation is a barrier to any real converse between youth and age. In so far as one explains the difference in intellectual culture by, and associates it with, the biological disparity, one loses the possibility of discussing common problems and common matters of interest, of finding in matters of fact the contact which cannot be found elsewhere. It is simply not true that youth is to be equated with fruitfulness and age with

Old Age

torpidity. The sovereignty of age has no fewer disadvantages than the exclusive leadership of youth. No doubt there are, in the history of a nation, moments and tasks which are reserved for youth.

The solution of the problem lies in a distribution of tasks between the age-groups. The attempt to allot such tasks to the old as are appropriate to their biological status has hardly been made hitherto—at all events, in a systematic manner. But when it has been made it has been most fruitful of results. For example, in the United States and in Germany R. B. Hersey has distinguished, in the case of certain categories of workers, two types among the older age-groups. The first type he found in a Pennsylvanian textile factory. There the older workers had to cling on to their jobs, but received no sort of consideration as older colleagues. Some of them, consequently, were frankly embittered. Hersey found the other type on the Pennsylvania Railway, and in the German Reichsbahn. None of the older workers with whom he came into contact presented any problem as regards their affective life. Hersey attributed this to the fact that in this industry there is a certain system of giving the workers tasks befitting their age; the older workers are not only treated with greater consideration, but they are employed on such tasks that the most effective use is made of the ability acquired by long years of work; so that both their position and their earnings appear just in their own eyes.

In general, however, we have not as yet got beyond the notion of the maximum age-limit as the solution of the problem. The fixing of an age-limit cannot be entirely dispensed with, but the rigidity of the limit, and its purely negative aspect, can be avoided. The age-limit should be accompanied, at least in certain occupations, by the allocation of new tasks, suited to the later stages of life, and utilizing the experience of age; much as is prescribed by the Mosaic Law of the Levites: "This is it that belongeth unto the Levites: from twenty and five years old and

The Old Generation and the Young

upward they shall go in to wait upon the service of the tabernacle of the congregation; and from the age of fifty years they shall cease waiting upon the service thereof, and shall serve no more; but shall minister with their brethren in the tabernacle of the congregation, to keep the charge, and shall serve no more" (Numbers viii: 24-6).

A somewhat similar recommendation is made by W. B. Pitkin in his latest book, *Careers after Forty*: "America sorely needs hundreds of Councils of the Elders. Every village needs its Wise Man. None such should be governors or senators or mayors or police commissioners. On the contrary! We ought to forbid the wise men to hold such posts. Leave that drudgery to the husky youngsters. But surround the youngsters with able advisers, who are free to gather facts and to interpret them. Let the administrators be free to accept or reject advice from these counsellors. We may centre full responsibility in those who have the power to act. But let us be sure that every administrator has too many wise men on his consulting staff rather than too few."

In the intellectual occupations especially we should preserve a certain elasticity of the age-limit. As we have already seen, it is precisely in the highly gifted individuals that the curve of physical and intellectual life and output assumes a completely different form from that which is characteristic of the average human being. The question is, whether an individual is physiologically old, not merely chronologically aged. It will be the task of science to investigate this problem more thoroughly.

In a healthy people we find the simple and natural conception that it is "the heritage of the Lord" that man should prosper and live long upon the earth. Where life is in this sense earth-bound, and obedient to the laws of nature, the problem of the generations finds its own solution. It is worth while to examine such a natural solution.

In the canton of Bern we find, by the side of the farmhouse, the 'dwelling-house,' a little house to which the old people retire with such possessions as they have reserved on

Old Age

making over their property to their heirs. In Austria a little house of this kind, serving the same purpose, is known as the *Auszughäuschen*. The Bernese 'reservation' perhaps represents one of the best solutions of the problem of the generations and the problem of providing for the aged—the admirable creation of an ancient peasant culture. The Bernese anthropologist Emanuel Friedli writes: "When the family increases the house cannot expand with it. The farmhouse can tolerate only one farmer, the farm only one successor. There are various ways of accommodating the old people, according to circumstances. The most usual solution is offered by the *Stock*, the *Stöckli*. 'I'll move into the *Stock*, we'll go into the *Stöckli*.' So say the aged parents who have given up the house and farm, reserving for themselves a sufficient portion, a suitable *Schliis*. As *Schliisvater* and *Schliismutter* they retire with this old folks' portion—not always from the same motives. The most ordinary motive, after all, is the need to rest. I have done my job, says one contentedly. . . . But another tells himself bitterly that he is no longer needed; he is only in the way. How difficult he finds it to hand over the reins! A new age and new conditions have come upon him; he cannot reconcile himself to them; his services are no longer appreciated as he would wish. An embittered man, he withdraws to the *Stöckli*. Thither also, for the rest of their lives, the old man's aged brothers may retire, and his aged sisters; his uncle and aunt, too, from whom he has expectations; his cousin, and his godfather . . . for all those cases, how closely related are farmhouse and *Stock*! So close are they that the inmates of the *Stöckli* always know if the people in the farmhouse have had a particularly good day. So close, too, that if any misfortune has befallen them, there is consolation and a refuge in the *Stöckli*. On the other hand, if the old people fall ill, or are in need, how quickly help comes from the farmhouse! But how far apart are farmhouse and *Stöckli* when there is discord between them! Often enough it would be a good thing if a Chinese wall stood between them,

The Old Generation and the Young

so that one's eyes would be spared the sight of what annoyed one so!

"But then, what the *Stöckli* means to the children of the farmhouse! It is their favourite resort, if beloved grandparents or godfather and godmother are living there. And how often the inmates of the *Stöckli* are the guardian angels of the little ones, if by chance the vigilance of the people of the farmhouse fails, and the uncovered manure-pit threatens them with hideous danger! Old eyes are often still keen!"

Jeremias Gotthelf, in *Anne Bäbe Jowäger*, has something to say about the relations between grandparents and grandchildren: "The parents are the children's sun, in whose warmth they grow ripe. But the parents are often cold, absorbed in the labours of the day, their time filled up with work, and giving orders, and uttering reprimands; that is their ever-recurring task; the suppression of nascent evil their constant preoccupation. The grandparents are the children's dew; it is they who with their unsparing love nourish the childish affections, and keep them fresh, who always have an open heart for the children's griefs and joys, who see to it that the child's heart is not hardened by the cruelty of life, but remains tender and open to goodness and beauty and love. And, on the other hand, the children refresh the ageing heart, which were else quite empty and withered. For the children have outgrown the parents' hearts; they need help less, they have become more reserved; their place is taken by the grandchildren, who fill the ageing heart with new joys, new hopes, and refresh it daily with the dew of love." On the other hand, the *Stock*, this institution of a highly-evolved peasantry, is contrasted with the unfeeling harshness of other agricultural peoples toward the unprofitable consumer, who, as the Russian peasants express it, eats another's life. The classic description of the *Stock* and its importance to family and kinsfolk will be found in Jeremias Gotthelf's tale, *Der Besuch auf dem Land* (The Visit to the Country):

Old Age

“Sime Sämeli’s son had his bed in the *Stock*: that is, in the little building without outhouse or barn which stands beside so many Bernese farmhouses. The position of the *Stock* is unique. Sons and daughters are not loth to live in it; nocturnal excursions and nocturnal visits cannot be detected by the farm servants and maids who sleep in the farmhouse. But when the son becomes the farmer he leaves the *Stock* and settles down in the farmhouse, so that he can keep watch over it. The hare sleeps with its eyes open, so the true farmer sleeps with his ears open. He hears the dog bark; he hears the horses trampling in the stable; he hears if any one is moving in the house; if questionable footsteps are creeping round the house, or stealing from one room into another. When the farmer has lived through his years of watchfulness, when he has become a grandfather, and when as his strength fails the longing for rest comes over him, he withdraws from the house and settles down again in the *Stock*; not alone now, but with his aged wife, who has known love and born sorrow with him, and with him has watched and tended; and often a beloved grandchild joins them, who has discovered the treasure of its grandparents’ love, and has contrived to claim it as its own. But if they go across to the *Stock* it is not in order that they may creep out into the world undisturbed, but in order that they may quietly and gradually withdraw themselves from the world, and rest from the labours of the world, and prepare themselves for the last removal, from the world to the cool grave, where the door opens upon the eternal light. Such a *Stock* is thus, first of all, the home from which one creeps out into the world, and into which the world comes creeping with its folly; but it is also the last hostelry of the tired wanderer, in which body and soul take leave of each other, the body, in order to go to the grave, and sleep, but the soul in order to tread the shadowy ways which are hidden from the mortal eye. Happy the house whose *Stock* is a holy place, from which many children rush unsullied into the vortex of the world, to which they return with a clear conscience

Valuations of the Aged

after the day's work has been faithfully performed, then in faith and hope to wait upon him who dispenses his gifts with generous hand, yet calls upon the recipient to give account of the gifts received." (See Plate I, p. 42.)

VALUATIONS OF THE AGED

A FEW years ago a book entitled *Life begins at Forty* was published by Walter B. Pitkin, a professor of Columbia University. The increasing average age of the population, which is beginning to make itself felt even in America, does not cause this author the least misgiving. In the restricted circumstances of the past, he argues, any fairly sensible young man could easily understand what it was needful to know on a small farm or in a tiny village community. This knowledge he could profitably apply in the years of his greatest creative power—that is, between the ages of eighteen and forty. To-day even an old man cannot survey the world with all its happenings—how much less, then, a young man! It is true that the world is becoming more and more complicated. But precisely for that reason the older men, who have passed their fortieth year, find that they have an ever-increasing advantage over the younger men, while, at the same time, they have less and less need to take the gradual decline of their energies to heart. In a few decades conditions will be ten times more complicated, because by then the world will no longer know anything of distance, but will have become one enormous village. No one under thirty-five will then be able to obtain even a rudimentary notion of the entire economic and social complex, with all the technical problems arising therefrom; thus, by a process of natural selection the responsible posts will be filled by older and more experienced people. The more difficult the problems which have to be solved, the greater the consequences of those persons who by virtue of age and ripeness are equal to the task. In the future the restless energy of

Old Age

youth will no longer be valued so highly as it is to-day. In other words: many spheres in which they have hitherto found opportunities of asserting themselves will be closed to our young men. Some of our largest business concerns have already realized this. For a time it was thought only proper to appoint young men of great promise to responsible positions. But it was soon realized that they often missed fire when important decisions had to be taken. Precisely the same experiences have been reported, during the last ten years, in respect of very young bankers, headmasters, trustees and stockbrokers. It is becoming ever more evident that the assumptions which were valid in our pioneer epoch no longer hold good to-day.

And what applies to commercial life is no less true of politics. "Young men," says our author, "wrote the Constitution of the United States. Many had barely turned thirty. To-day no young man could qualify to write a new constitution for us. The America of revolutionary days was smaller and less intricate and slower than any one of our large cities in 1937. Its people were pretty much alike in background and aims. It had no problems comparable to ours. Labour, utilities, money, housing—name whichever you will, you will agree that our burning issues call for incomparably more mature understanding than was needed for any issue of 1776 or 1789." And Pitkin sets his hopes for the future of humanity on the old men. The preponderance of perspicacious elderly people, he thinks, will sooner than anything else bring the disorderly business world to its senses.

Pitkin's was no voice crying in the wilderness. In the United States there is now actually a movement which aims at winning for the old their proper position in commercial life. Mr. Henry Simler, president of one of the oldest type-writer manufactories in America, has induced an employers' organization to appoint a committee whose purpose is to wage war upon 'Fortyphobia'—the notion that men are 'too old at forty.' In the course of its campaign the com-

Valuations of the Aged

mittee does not appeal for sympathy for the elderly unemployed; on the contrary, it offers evidence that it pays abundantly to employ elderly people. According to statistics relating to nineteen makes of typewriter, the average age of the most successful salesmen was 44.5 years, but records were made by a few septuagenarians. An investigation of retail trades, from California to New York, shows that men in their fifties are the best category of salesmen. The above mentioned committee distributed to thirty-one prominent employers a questionnaire—"Forty Plus or Minus?"—with thirty-one questions, such as the following: "Who brings you the greatest number of fresh suggestions, the man under forty or the man over forty? In which do you find the greatest loyalty? Which is the more eager to learn? Where do you find the greatest conscientiousness?"—and so forth. In the answers to these questions, youth won a partial 3 to 1 victory in respect of outward appearance, good humour, and enthusiasm. But in the answers to questions relating to actual production, readiness to undertake disagreeable tasks, organization and subordination, the 'Forty Plus' were victorious by 3 to 1. There was practical unanimity in respect of the greater conscientiousness of the older men when working without supervision. Mr. Simler concludes his report by stating that inquiries show that by the time they are 40 or 50 men have learnt the necessity of organization and co-operation. Experience has taught the over-forties the art of mixing with men, and a technique of finding their way about in novel situations, where the inexperienced would be helpless. The analogy of human life with the deterioration-curve of a machine does not hold good: men ripen, machines do not. Of course, there can be no question of a conflict between youth and age. Business needs the briskness of youth no less than the experience of age. But the personnel of a business in which one age-class is unduly preponderant is not in a state of equilibrium.

It actually seems that the movement initiated by

Old Age

Mr. Simler in America is making progress. According to Ray Giles, the great General Electric Company has recently announced that 40% of its employees were to be over forty, in accordance with the age-distribution of the population as a whole. Henry Ford lays down the principle that the age-composition of the personnel should be parallel with that of the city in which the business is situated. In one of Ford's factories, of 700 newly-engaged workers, it is reported that 200 had passed the age of fifty. Ford found by experience that for most kinds of work which in any way call for steadiness, or perseverance, and positive interest, men between 50 and 60 years of age are most suitable.

Recently similar opinions have been recorded in Germany. Hertha Siemering was able to show, from a mass of numerical data, that in the year 1933, of male workers employed in industry 21.03% were fifty or more, and 17.17% of the female workers. In the case of brain-workers, whether male or female, the proportion of elderly people is for the most part considerably above these figures, as may be shown by a few examples: among judges, magistrates and public prosecutors the proportion is 48.6%; among high-school teachers, 38.38%; among barristers and solicitors, 35.48%; among painters, 39.35%; among architects, 32.03%; among doctors, 31.58%. The authoress comes to the conclusion that brain-workers are often actively engaged in their profession at an age when in other forms of occupation they would have been long ago forced into retirement. Yet the productivity of these elderly workers is far from exhausted by the years of their professional career, which, though it may be long in comparison with other forms of occupation, is nevertheless too short in the case of many kinds of brainwork. Hertha Siemering did not like to see this economic capital lying fallow. "There must be in Germany something like an invisible intellectual reserve army, some part at least of which ought to be restored to activity. It does not, for the moment, however, consist mainly of the unemployed, but rather of individuals

Valuations of the Aged

who in other situations could do more and better work than they are permitted to do in their present positions. Many elderly men who as employees have to do intellectual work are to-day fitted into the time-table of a business with regard for the exigencies of their time of life. Since our national economy is becoming increasingly dependent on the efficiency of the elderly, we shall have to devise means of protecting our older workers. With increasing age, the hours of work must be decreased. The beginning of the working day and the periods of rest should be adapted to the decline of physical energy . . .

“If, in addition to the systematic economizing of the physical powers, care is taken to provide the proper psychical atmosphere during working hours, an atmosphere in which the worker derives enjoyment from his labours so long as he is capable of working at all, there will be no further squandering of the vast capital embodied in the elderly brainworkers.”

There is a notable example to show how an ageing man may receive a stimulus to fresh and fruitful accomplishment by a change of environment or by assignment to special tasks. Justus von Liebig (1803-73), after twenty-eight years of strenuous teaching and research work in Giessen, had serious thoughts of retiring, as he felt that his efficiency as a teacher was declining. “If I still want to do anything at all,” he wrote to Wöhler, “I shall have to restrict myself.” Then came his nomination to Munich, which provided him with the most favourable conditions for his work. It became possible for him to change his mode of life at a time when he absolutely needed a change if he was still to do anything at all. It was now possible for him to organize his life in a suitable manner, and so he was enabled, amongst other things, to give practical form to his theories of plant nutrition. “What he did for humanity during this period differed from what he had done at Giessen, but was assuredly not less valuable” (Wilhelm Ostwald).

We must always keep it in mind that youth and age have

Old Age

their particular values, and that every phase of life has a task of its own to perform. This realization will help to alleviate and reconcile contradictions and conflicts between the two age-groups. "Every generation," said an Italian statesman, "bears its purpose within itself, and receives from its own life, from the values and the spiritual treasures which it creates, its meaning and justification."

THE ACHIEVEMENTS OF OLD AGE

JAKOB GRIMM (1785-1863), in his famous address of the 26th January 1860, "Concerning Old Age," declared as follows: "I believe I have adduced much evidence in support of the opinion that old age is not merely a decline of virility, but rather that it represents a distinctive power, which unfolds itself in accordance with its special laws and conditions; it is the season of a peace and contentment unknown in earlier life, a state in which peculiar influences are bound to manifest themselves."

In our earlier meditations upon psychic senescence we spoke of the artistic achievements of old age, and we have called attention to these as being a rich source of material for the investigation of psychic senescence. We shall now endeavour to examine some of these peculiar influences in the achievements of old age. In so doing we must follow the indications of such knowledge of psychic senescence as we have already acquired; on the other hand, what we may have to say concerning the creative achievements of old age will offer fresh glimpses into the ageing psyche.

Even in the purely biological sense it is a matter worthy of note when men of advanced age achieve outstanding performances in the most varied departments of human activity. There is truly no lack of such examples. Paul Herre has recently shown, by a digest of nearly a thousand individual cases, to what an extent peculiar intellectual

Lorenzo Bernini 1598–1680

- VI. Cardinal Scipione Borghese, 1632 (Rome, Galleria Borghese)
The work of the 34-year-old sculptor
- VII. The Physician Gabriele Fonseca, 1670 (Rome, S. Lorenzo in Lucina)
The work of the 72-year-old sculptor





The Achievements of Old Age

achievements are possible in old age. He has included reigning sovereigns, statesmen, politicians, army leaders, princes of the Church, philosophers, scholars, poets, painters and sculptors, musicians, singers and actors. As the result of his investigations, in which he abstained from the critical evaluation of the achievements of extreme old age, Herre came to the following conclusions: "It is astonishing to what an extent the human faculties are preserved, despite all the encroachments of old age, so long as the central organs, and in particular the heart and the brain, are not worn out or actually diseased."

As a supplement to Herre's account, one may cite Dorland's digest of data relating to masterly achievements and old age. Dorland's list comprises four hundred supreme achievements of eminent men. Chemists and physicists achieve their masterpiece at 41; poets and dramatists at 44; novelists at 46; explorers and generals at 47; actors and composers at 48; painters and theologians at 50; social reformers and essayists at 51; physicians and statesmen at 53; philosophers at 54; astronomers, mathematicians, satirists and humorous writers at 56; historians at 57; jurists and naturalists at 58.

Such group-averages can—but only with the greatest precautions—be utilized as the starting-point of further considerations, or even practical measures; for the composition of the group depends wholly on the will—and perhaps the arbitrary choice—of the compiler. However, they show the significance of the age-factor which plays its part in all human activities. The zenith of physiological maturity is reached earlier; the highest intellectual achievements follow much later. This holds good for eminent brainworkers, as well as for the average man. If the achievement consists mainly in the originality of thought and action it may indeed come rather earlier; but if it depends on the comprehension and elaboration of accumulated knowledge, and on experience, then a more advanced age may be taken for granted. "An old man who has lived

Old Age

at Court," writes La Bruyère, "who has much sense and a faithful memory, is an inestimable treasure; he is full of facts and of maxims; one finds in him the history of the century, invested with most curious circumstances, which can be read nowhere; one learns from him rules of behaviour and of morals which are always reliable, because they are based on experience." Great achievements are not peculiar to any age. This is shown by the investigations of J. F. Fulton, who has selected seventy-six works of importance in the history of physiology, and ascertained the age of the authors. In the case of 45% of these works the authors were less than 40 years old; in the case of 55%, over 40. Fulton then investigated the activities of one hundred chemists who had distinguished themselves by some special achievement in their own department of science. In forty-one cases the discovery was made or the invention produced before the 40th year; in thirty-four after the 40th year; in nineteen after the 50th year; in five after the 55th year; and in one in the 69th year.

Within the sphere of human activity it is the task of the old to administrate, to accumulate, to conserve, to complete. In this way a burden is lifted from youth which would restrict its independence. Youth is thus set free for fresh achievements and new ideas. Age and youth have their separate tasks, and one may ask oneself which is the more important. If human society is to preserve its culture as a basis of further development, then the function of preserving this culture, which is the task of the old, is probably as important and as necessary as the innovations, the search for new paths, the pioneer activity of youth. Everything that is new will appear all the more fruitful and beneficent if the opinions, the experiences, and the needs of all age-groups have been respected. In youth and early manhood the armour is forged, skill is acquired, and the eyes are set upon the goal; the years of maturity lead to the zenith of original achievement and vigorous activity; in later years hypotheses are verified and corrected, new material is surveyed and

The Achievements of Old Age

tested; then also is the time for teaching what has been learned, for preserving the acquired values and transmitting them. Great things are achieved, as the American neurologist G. M. Beard (1839-83) tells us, when enthusiasm and experience are counter-balanced. But life is not wholly occupied with the production of masterpieces. There are periods of preparation and provision, which must be cherished no less than the time of great achievement.

The testimony of Theodor Mommsen (1817-1903) confirms what has been said concerning the relation between intellectual work and the age of the worker. "We scholars, above all, know from our own experience that the great scientific achievement cannot be brought to a completely successful conclusion without many years of continuous and uninterrupted labour. It is perhaps correct that in men like Gauss the great ideas by which they have advanced the world's store of knowledge have all occurred to them in their youthful years; but the sowing is only one half of the scientific profession, and the time of harvest is no less indispensable if a great scholar is to fulfil his destiny." Here we may cite the words of the historian Leopold von Ranke (1795-1886), who wrote, at the age of eighty-one: "Poets, as the proverb says, are born. Not only the arts, but also some of the sciences commonly manifest themselves, the arts in their full bloom and the sciences in their most vital originality, in the years of early manhood. Musicians and mathematicians are privileged, in that they can achieve some perfection in their early youth. The historian must be old, not only because of the human ambit of the studies which the understanding of historical development necessitates, but also because of the transformations of contemporary conditions which occur in the course of a long life. . . . It is essential to his development that great happenings should take place before his eyes, that upheavals should occur, and innovations be attempted. . . . He must live through many changes, and take part in the general development of a great epoch if he is to be capable of judging earlier conditions . . ."

Old Age

How far does the output of old age reveal any special quality? Does it exhibit peculiar values of its own, so that it should be given a place of its own? We have an answer to this question in the words of a poetess: "Old age transfigures, or it petrifies" (Marie von Ebner-Eschenbach). Perhaps we can most readily determine if there is any foundation for the claim by studying the work of the painters and sculptors.

Even in the Romantic period an attempt was made to take a profounder view of art—though the actual history of the fine arts is the offspring of the nineteenth century—and to achieve a deeper psychological understanding of the work of art, by placing it in its historical setting, and seeking to explain it in terms of its period, at the same time endeavouring to understand the artist and his intentions. We have to thank A. E. Brinckmann for the attempt to demonstrate, in respect of the plastic arts, the influence of the artist's age on his artistic creations. The analysis of the late works of great masters throws considerable light on the problem of the output of old age. Brinckmann, in the course of his inquiry, discovered certain laws by virtue of which the works of art produced in the different stages of the artist's life possess a special character. A phasic mutation which occurs on the approach of old age passes from the dynamic phase to that of introversion, or from an interest in external relations to self-observation, and the special characteristics of the old man's style are: inward harmony and introspection. An intensive examination of the work of aged artists will often yield surprising confirmations of Brinckmann's arguments.¹

This may be shown by a few examples. If we compare the painting of "Christ and the Crown of Thorns" in the Louvre, the work of the mature Titian (1476–1576), with the same composition in the Alte Pinakothek in Munich, painted in the 95th year of the artist's life (see Plates II and III, p. 81), we shall see that there are great differences in

¹ In respect of the following pages I have to thank Dr. Hans Reinhardt of Basle for many valuable hints.

The Achievements of Old Age

the technique and construction of the two paintings. Here Titian has composed a large group in the manner of Michelangelo. The *maniera grande* of Michelangelo made a great impression on him on the occasion of his visit to Rome. The later picture is particularly interesting, because it is literally almost a repetition of the earlier composition. And yet, how the whole conception has changed! All subsidiary elements, the details of costume and modelling, the reminiscences of ancient Rome, have been suppressed. The painstaking and detailed exposition has been replaced by broad and sweeping brushwork. This change has often been attributed to the failing of the venerable artist's eyesight. But there is something more than this at work. How much greater is the concentration in the later picture, and the sincerity in the face of Christ, as against the pathos of the earlier conception! And as all is steeped in a flickering light, hardly to be separated from the action, and diffusing its revelations, we have a vision, not merely of a tragic event, but a timeless image of pain regally endured.

In Titian's fellow-Venetian Tintoretto (1518-94) the phasic change is expressed in the same way. In "The Marriage in Cana," painted, for the Church of Santa Maria della Salute in Venice, in the 43rd year of the artist's life, we see a classic conception of the subject (see Plates IV and V, p. 128). The table, receding directly into the background, the room, with the perspective of the coffered ceiling, the busy servants, are all represented in clarity of detail. But about 1586 Tintoretto developed the rudiments of a new style, and in the "Last Supper," which the master painted between 1591 and 1594 for San Giorgio Maggiore in Venice, we have a particularly impressive example of his new art. Again the composition is closely related to that of the earlier picture, yet all is essentially changed. The table runs diagonally across the canvas, as in Titian's picture, but with an individual difference, there is a magical light which illumines the central and more important figure, and thrusts the rest in the shadows. It no longer falls on an uncon-

Old Age

cerned, cheerful company, but breaks out of the principal character—Christ—and spreads from him and from a smoking lamp over the deeply impressed and agitated company. The servants are still there, but even they are directly and indirectly included in the event. We still see the beams of the ceiling, but the cloud of phantasmal, flitting shapes of cherubim drifting beneath it fills the room with an almost supernatural and visionary atmosphere. This picture is accounted the supreme example of Tintoretto's art.

It is not only in painting that the difference between the early and matured style and the style of the later years may be observed. It is as plainly perceptible in the work of the sculptor. Comparison between the marble bust of the Cardinal Scipione Borghese, the work of thirty-four year old Lorenzo Bernini (1598–1680), with the bust of the physician Gabriele Fonseca, the work of his seventy-third year (see Plates VI and VII, p. 160), reveals unmistakably a similar change in the sculptor's life. Tense vitality and interest in externals are expressed in the first of those works, and one cannot sufficiently admire the brilliance and the unexampled virtuosity with which the rather plump features of the Cardinal and the shimmering, crackling satin of his robe are represented in marble. Even in the formal quality the difference between this and the bust of Fonseca is very great. The skill of the artist is no less, but it is modified. The material differences in the representation of the clothing, the cloak and the fur border, the reproduction of the singular features and the flexible hands, are not less perfect. But the plastic forms are remarkably discreet; in comparison with the earlier virtuosity they have gained sobriety; they no longer fill the principal role. Here all centres upon the inwardness of the man. And it is touching to see with what passion the old man presses his left hand in affirmation to his breast, and how the right hand clasps the rosary, as the symbol of his only safeguard in the storms of life. In this late work the portrait style of Bernini rises to transcendency.

The Achievements of Old Age

Such examples can be multiplied at will. The painters Giotto, Leonardo, Dürer, El Greco, Rubens, Rembrandt, Frans Hals, and Goya, the sculptors Donatello and Michelangelo, to name only a few, show the same increasing profundity of the inner life in their later works. But in modern art also one can detect similar mutations; think, for example, of the difference between the early and the late paintings of Arnold Böcklin, and in the work of the sculptor Aristide Maillol the evolution of the veteran's style can be most clearly followed.

From among the great number of modern artists who have continued to work to an advanced age we will take the example of Renoir (1841-1919). "Age treated Renoir generously," said Julius Meier-Graefe: "his plastic qualities are exclusively the gifts of old age." The difference between his early productions and the works of his later period is admirably described by Louis Gillet. In the "*Jeune fille*" of 1889 (see Plates VIII and IX, p. 176), Renoir gives us an impression of Nature, as the impressionists Manet and Degas reproduced it. "*La Bergère*" of 1903, on the other hand, is no longer aiming at a naturalistic reality, and his contemporaries, faithful to their programme, even reproached Renoir for his departure from truthful reproduction. As in the case of Titian, so here some have sought to explain the broad brushwork of the old Renoir by his physical infirmity; his hands, crippled with gout, could no longer hold the brush, so that he bound the brushes to his wrist, and actually painted with his arm. But in the meantime he was consciously departing from his earlier style. He often gave verbal expression to this change of outlook. More and more he worked himself up into a boundless enthusiasm for the almost absolute play of colour on soft bodies, fabrics, and flowers, so that his art was a rapturous chromatic display, inspired by reality, but exalted to a visionary beauty which a black and white reproduction can never represent.

In connexion with Renoir mention should be made of the late work of the painter Paul Cézanne (1839-1906), which

Old Age

betrays very special features. The old Cézanne has been compared with the aged Titian. About 1900 he adopted methods which were an innovation on those of his maturity. While in his mature period he emphasized the rhythmic and architectonic elements, in his last phase he was possessed by a passionate impulse of liberty, and he mitigated the austerity of his earlier years. But this liberty was followed with all his knowledge of the rhythmic structure of a picture, so that there was nothing youthful about it; it was rather penetrated with the astringency and earnestness of an old man whose whole character had been shaped by a lifetime of hard work.

Consideration of these late works of the great masters convinces us that in them we can detect neither loss of skill nor a failure of creative power. They are all on a high level, and there is no trace of declining artistic achievement. Compared with the earlier works, the later works have a quite special character; they reveal a further development of a significant nature. They are born of a peculiar and to some extent a new artistic temperament. The later works of an artist tend quite essentially to influence the character of his integral artistic output; without them the impression which his life's work produces on posterity would be quite different.

Theodor Hetzer, a writer on the history of art, comes to similar conclusions in his analysis of Titian's life-work. He shows how the creative work of the artist passes through certain transformations in the various stages of his life. Titian, a remarkable phenomenon even in the biological sense, continued to work with undiminished vigour until his death—he died of plague at the age of 99. From 1550 onwards we can speak of the style of his old age. "Whereas in the forties," writes Hetzer, "Titian was violently moved by all wishes and desires, all actions and events, even to the point of brutality, now his inner mind is more and more engrossed with the image of things, with mere beholding, pure of all willing or desiring. Like Charles V, with whom

The Achievements of Old Age

he may have felt a certain kinship, Titian renounces the world. But as an artist he is all the richer and happier; he does not take to flight; he does not withdraw from the busy world and enter a cloister; he paints with greater ease and freedom than ever; he finds in his work completion and transfiguration. Under the radiant star of pure contemplation stands all that Titian painted after 1550, and we rejoice in our hearts to see the eye of this passionate man, whose primal vigour and sympathy survived into his mythical old age, still resting, wide and tranquil, on the appearance of things. But it is glorious to see how higher and higher worlds are disclosing themselves to the beholder. . . . Yet there are the years of the sheerest painting, the loveliest handling of colour, and the greatest perceptivity in the unity of the spirit with the material colour." To which we may add these words of Delacroix: "If one lived to be a hundred and fifty one would prefer Titian above all others. He is not the man for youth." And Ulrich Christoffel writes of Titian: "His pictures first become bright and living when we intercept their vibrations and transitions in quiet self-communion; they do not seek to relate and represent, but by their colouring to move the soul and the contemplative mind in silent encounter."

There are also cases in which a genius passes through the stages of life in his artistic output more rapidly than is compatible with the chronological passage of time. Of this, Rembrandt may be cited as a striking example. The experts find in the prematurely aged Dutchman a corresponding modification and transformation of his artistic output. With sensitive perception, Ulrich Christoffel follows the age-phases in the work of this master: "Rembrandt was best able to display his power of pictorial representation in the representation of old age, in the portraits of aged men and women, to whom he was sympathetically drawn, since in their faces the volitional life was already receding into the depths of the spiritual. Rembrandt was never really young, just as Rubens never grew old. So, for ageing men and

Old Age

women, grey and silent, for prophets and anchorites, for Paul in prison, for Jerome in the desert, for the father of Tobias, and indeed for every stage of human infirmity and decay, he was able as no other painter to find an inward translation and an inspiration for pictorial forms in which his own destiny was obscurely interwoven with the figures portrayed. The plastic art of Rembrandt was in a sense the art of an old man, of a seer and anchorite, in which the whole concentrated essence of life was embodied in colour; and there was always a danger that the connexion with concrete things might break, and that his art would be deprived of the necessary opposition and contrast of the real and living object. Rembrandt himself had no personal experience of extreme old age, since he died at sixty-three, but for him age meant a picturesque condition of the human being, by means of which he could most plainly reveal the power of light over matter."

Brinckmann, proceeding from his observations of works of the plastic arts, has endeavoured to gain some insight into the phasic changes in the later output of poets and other writers. Every author is in a certain measure his own autobiographer; every story expresses the writer's self. Or as Grillparzer said: "Every biography is an autobiography."

Just as Hetzer and Christoffel were able to follow the inner, spiritual evolution of Titian in his life's work, so Brinckmann endeavours to indicate the phasic changes of Dante in the *Divina Commedia*. "Dante," he writes, "was occupied with the *Divina Commedia* from his 38th to his 56th year, and in it such changes can be clearly traced. The almost mathematically calculable, quite deliberate relations in the structure of his Hell became ever more shifting and indistinct; finally, we have a succession of pictures without objective distinctness; he begins to mingle all his colours. Here lies a meadow of gold, silver, emerald, and multi-coloured gems. A river winds through banks of flowers; in eddying play ruby-red sparks leap from its waves into the

The Achievements of Old Age

calyces of the blossoms and fall back into the stream. A haze of coloured light emerges from the infinity of space only in the 29th canto of the *Purgatorio*, growing ever brighter until the moment when the blessed Beatrice appears to the great lover. Then, to the conclusion in the 30th canto of the *Paradiso*, that cosmic totality and harmony is found, scarcely perceived, but foreknown by faith."

Much has been written concerning the output of Goethe's old age. Half-way through this period he wrote the continuation of *Dichtung und Wahrheit*, *Wilhelm Meisters Wanderjahre* and the second part of *Faust*. By virtue of the poet's age, and their emotional content, Goethe's last poems are the work of an old man. Nevertheless, as regards conception and creative power, depth of feeling, and practical wisdom, moral content and wealth of ideas, they betray no indications of subsiding energies. "Even in their style they indicate no decline, but it is precisely the complete novelty and individuality of this later style that gives this final creative period the stamp of the unique and independent position which it assumes in his total output, for we see a development absolutely parallel with the factors which have determined this latest period of old age. He now appears, in contradistinction to the earlier dichotomy between the maternally influenced idealistic trait and the paternally influenced sober rationality, completely integrated" (Paul Herre). Goethe himself saw the cause of this creative period in his old age, which was passing with undulatory movements, in a late puberty. He told Eckermann, in 1828: "Such men (i.e. such as produce important work in old age) and their life, are genial natures, and the circumstances of their lives are peculiar. They experience a repeated puberty, while other people are young only once. . . . This is why, in the case of exceptionally gifted men, we observe ever fresh epochs of special productivity, even during their old age; in them, from time to time, a temporary rejuvenation occurs, and it is that which I would call a repeated puberty. But young is young, and however powerful an

Old Age

entelechy may manifest itself, it will never quite gain the mastery over the physical, and it makes a tremendous difference, whether it finds in the physical an ally or an adversary. There was a time of my life when I could require of myself a printed page every day, and I could produce it with ease. . . . What in my youth I was able to do every day and under all circumstances, I can now do only periodically and under certain favourable conditions."

Ernst Kretschmer seeks to extricate the biological truth contained in these poetically intuitive words of Goethe's. He writes: "The average man reaches the summit of his social usefulness, ripeness and experience only in his middle years; the summit of his personal value, in the sense of independent intellectual productivity, he most frequently reaches in the second half of the period of puberty. We have heard what Goethe said: 'Genial natures experience a repeated puberty, while other people are young only once.' If we analyse the inherent biological truth more narrowly, we might at once deduct, as the first group, the hypomaniacs; people like Goethe's mother or Field-Marshal Blücher (1742-1819), over whose inexhaustible vitality all stages of life pass without leaving a trace; they may even, like Blücher, begin their career in advanced old age. Even apart from this group, the vital curve of highly gifted persons often assumes another form than that of the average individual. After the storms of youth the most valuable development of their personality begins where in the average man it ceases; owing to a constant impulse toward production, they achieve their ripest and most individual work until the approach of extreme age. . . . Even the incipient rigidity of extreme age merely serves to throw into more imposing prominence the firm articulation of their personality."

The career of Voltaire (1694-1778) is highly instructive. In the middle of the sixties Voltaire was the most famous man of his time. But this fame was based on performances of an ephemeral nature. If he had died at sixty one would

The Achievements of Old Age

remember him only as an over-estimated poet and a thoroughly sensible man. As a matter of fact, the first sixty years of his life were only the preliminary stage for what was to come. On settling down at Ferney Voltaire applied himself to his real life's work. His bad health gave him little hope of a long life; nevertheless, he lived to be very old, dying at the age of 84. His extraordinary will to live never failed him, even to the last minutes of his life. For a quarter of a century he worked with all his might. The story of his years at Ferney is recorded in his enormous correspondence, which is one of the most impressive monuments of human energy. In these letters we find not only a tremendous mass of facts: they also contain the daily reports of a memorable battle, and are distinguished by the exquisite beauty and æsthetic perfection of their form. "Behind these letters appears the vision of a human spirit of quite a special stamp" (Lytton Strachey).

In Chateaubriand (1765-1848) we have another example of a later puberty in the sense of an incessant urge to production in old age. André Maurois says of him: "At this advanced age the man of letters produced a second efflorescence, and these autumn roses were perhaps the fairest. In the later volumes of the *Mémoires* and in the *Vie de Rancé*, works of these unregarded years, he achieved a freedom of style, a boldness in the choice of words and the selection of images which he had been far from possessing in the time of the *Génie du Christianisme* or *Les Martyrs*. His language is more original and richer than ever. In these later works he is one of the great French writers of all ages."

The old man's style is particularly impressive in the work of Gottfried Keller (1819-90). While the *Grüne Heinrich* is a subjective work—the author was 36 when he wrote it—*Martin Salander*, the work of his sixty-sixth year, is distinguished by the impersonal prose that marks the transition to objectivity.

"The first signs of old age announced themselves in the middle of the 80s, during the writing of *Martin Salander*.

Old Age

The work was continued with difficulty. 'I no longer work easily, and feel my age,' he wrote. One may hold the novel nature of the material mainly responsible for this delay: the earlier works, conceived years or decades before they were written, were ripened in the author's inmost mind, and woven by his undisturbed imagination, before he began to write; he needed only to bring forth what he had long been considering. In *Salander* he was dealing, objectively and subjectively, with new material; the events of the last few years had to be given their quickly-prepared form: a method of work which was repugnant to Keller's epic nature. . . . If in Keller's creative work a playful jester and a preaching moralist had hitherto agreed to share and share alike, now, in his later work, the moralist has imposed silence upon the jester, or rather, has taken him into his service" (Emil Ermatinger).

Walter Muschg has recently traced this late metamorphosis of Keller in an essay, *Gottfried Keller und Jeremias Gotthelf*. He was able to show that Keller, a generation younger than Gotthelf (1747-1854) found that he could do the latter justice only when he himself had passed through a similar development. "Even this mood of cheerful serenity," he says (meaning the mood of the novels, *Die sieben Legenden* and *Jungfrau als Ritter*), was not the last. It became overcast, as in Gotthelf, with scepticism and resignation, finally giving place to unrest and bitterness. Belief and the lack of belief in humanity, in the future, are blended in him as in the last works of Gotthelf, in whom he had once so strongly reprobated this admixture of faith and unfaith. . . . Keller's scepticism is gloomier, more depressing than that of Gotthelf, because in him the counterpoise of religious conviction is lacking, a conviction which Gotthelf never entirely lost. . . . But it is just this laboriously produced book (*Martin Salander*) that offers the last, doubly affecting manifestation of the power that lay dormant in his poems, and which gives him a fundamental resemblance to Gotthelf."

The Achievements of Old Age

We have an almost classical example in Theodor Fontane (1819-98); his enduring work is exclusively the work of old age, and bears the marks of age. The five great novels which brought him fame he wrote between his 66th and 77th years; in his earlier books, now long forgotten, he moved in a romantic glorification of knightly deeds and royal misfortunes. In his great novels he deals with the fate of everyday people. "To select only the poetical or pathetic subjects seems to him a sin against the wealth of the universe" (R. M. Meyer). We are confronted, therefore, with a transition to the epic, which, on the one hand, has a reconciling effect, and is full of humour, which, in Fontane's own words, "by hypothesis stands above the phenomena of life and sports with them in a serene and sovereign manner"; while, on the other hand, it is brutally naturalistic. Fontane's delightfully vivacious style is informed with a profound understanding of humanity, worthy of the high name of wisdom. It is as though the whole of his human life had been necessary in order to gain the insight and experience which enabled him to give of his best after he had passed the middle of his seventh decade.

The British author Walter Savage Landor (1775-1864) was 57 when he published *Imaginary Conversations*, which revealed him as the creator of a new prose style, and assured him of lasting fame. His earlier productions were only a preparation.

The novelist Bulwer-Lytton (1805-73) passed through some curious transformations during his literary career. About the middle of his life he abandoned the writing of sentimental and historical novels (*The Last Days of Pompeii*) and turned to the society novel; but then, from his 57th year onwards, he came forward with mystical tales of a completely novel kind. The work of his last twenty-five years betrays no signs of exhaustion, and his descriptions are as living as in the days of his youth and maturity.

Ernest Renan (1823-92) offers us an example of introverted transfiguration. In the last phase of his life he

Old Age

returned entirely to spiritual subjects. Any struggle for power in his time seemed to him debatable. "No action seemed to him worth getting excited about; contemplation and meditation alone never disappointed him. Life he loved only in contemplation, not as a possession" (Stefan Zweig). His experience had taught him that justice is possible only in the spiritual sphere.

In music, G. Verdi (1813-1901) astonished the world by his output in old age. At the age of 80 the composer wrote his *Falstaff*, a work of the greatest freshness and emotional intensity, full of racy humour. In the clarity of this production and the ascendancy of its humour one felt that here was the ultimate ripeness. *Falstaff*, too, showed the extraordinary mutability of Verdi, who after a series of emotional music-dramas could finally become the laughing philosopher of the *Falstaff*.

What has been said of the special qualities of the products of old age, and the late works of the great masters, has been expressed only in hints and allusions. And this perhaps is just as well; for as in respect of other spiritual contexts, so in this case also Goethe's observation holds good: "We should know many things much better if we did not know them too exactly. An object may first become comprehensible when we see it at an angle of forty-five degrees." What has been said should encourage the reader to understand a work of art in reference to the age of its creator; for every stage of life has its own psychic modality, its own beauty, its own right to exist, and is a section of life full of a significance of its own.

THE ACHIEVEMENTS OF WOMEN IN OLD AGE

In the preceding chapter we have spoken of the achievements of old men, and the special character of these achievements. Now we must examine the special character of the

Auguste Renoir 1841-1919

- VIII. Jeune Fille, 1889 (Private collection)
The work of the 48-year-old painter
- IX. La Bergère, 1903 (Collection of Bernheim Jeune, Paris)
The work of the 62-year-old painter. See page 167





The Achievements of Women in Old Age

achievement of women in old age; with the style of life—a style created like a work of art—of the ageing and aged women of the second half of the seventeenth century, and the eighteenth century; a conventional age, in which everything was characterized by a very pronounced style.

One of the most significant women of the second half of the seventeenth century was Ninon de Lenclos (1616–1705). Ninon de Lenclos arouses our admiration by her absolutely limitless vitality, which never deserted her during the eighty-nine years of her life. Thanks to this vitality she was able to give a unique pattern to the latest phase of her life. It took, of course, a very long time to transform the frivolous Ninon into the substantial Mademoiselle de Lenclos. A contemporary of her later years wrote of her: “I never saw this Ninon in her beauty; but at the age of fifty years, and even until she was over sixty, she had lovers who loved her greatly, and the most virtuous people in France for friends. Until she was ninety she was sought by the best society of her time. She died in full possession of her reason, and even of her delightful wit, which was the best and the most amiable I have known in any woman.”

E. Kretschmer would probably classify her as a hypomaniac. Age was powerless to affect her cheerful temperament. The apothegm of her friend La Rochefoucauld (1613–80): “Old age is the Hell of women,” had no meaning for her. Her soul was always joyous and vivacious, and this joy was the expression of her spiritual health. “The joy of the spirit betokens its strength,” she wrote to her friend and contemporary, the philosopher Saint-Evremond (1613–1703), with whom, to the end of her life, she kept up a lively correspondence. In it is reflected the same attitude to old age and to growing old; it became for both a source of encouragement and refreshment. “Nature,” writes Saint-Evremond to his friend, “will begin with you to show that it is possible not to grow old”; and: “You belong to all countries; as highly esteemed in London as in Paris; you are of all times, and when I cite you for the honour of mine,

Old Age

the young men immediately name you to give the advantage to theirs: You are thus mistress of the present and the past." And Ninon to Saint-Evremond: "Philosophy goes well with the charms of wit. It is not enough to be wise; one must please; and I see very well that you will always please as long as you think as you do think. Few people can resist the years. I believe I have not allowed them to afflict me."

Although Ninon's letters still appeal to us to-day by their charm, she doubtless gave the best of herself in conversation. The advice of the old lady was sought by young and old; she was the best company. Molière submitted his comedies for her approval. How infallible was her knowledge of men she showed even in old age. Shortly before her death she made the acquaintance of Voltaire, then ten years of age. His lively character interested her greatly. She gave him much good advice, and by her will she left him 2,000 francs for the purchase of books.

The brothers Edmond and Jules Goncourt have given us a profounder insight into the life and manners of the women of the eighteenth century. In their lively volume on the women of the eighteenth century (1862) they devoted an instinctive chapter to the old age of women.

According to the Goncourts, the woman of that period succeeded, both unconsciously and in deliberate self-culture, to give her later years their special significance, or—as Karl Jaspers puts it—to stamp upon her ego, in the circumstance of age, her individual style. We find this idea expressed also by the Bernese author C. V. von Bonstetten (1745–1832), who was in his every characteristic a typical representative of the eighteenth century. "The role of an old man in the world must be considered as methodically as though he were to act it on the stage."

In self-culture the spirit of the period found its expression. The attitude of the hedonist was held to be essential, and this led to a cultured epicureanism. However, the style of the age required that enjoyment should be disciplined. According to one's talents, one provided the self one had

The Achievements of Women in Old Age

shaped with as rich a content as possible, but always with regard for the laws of decorum.

To this plastic feminine personality the style of the age allotted, for the second half of life, four domains, in which she could continue to shape herself: *devotion, les bureaux d'esprit, les intrigues de la cour, le jeu, et l'habitude de donner à jouer.*

Let us briefly consider the first of these possibilities of self-formation in the later years of life: devotion. This piety had none of the consuming fire of the seventeenth century, so strong in faith. "There is no contemporary evidence that speaks of a profound and powerful religious movement, of a kind to touch men's hearts and take them by storm." Even here she sees a sort of hedonistic self-discipline in the women, of whom it is recorded: "One evening they left the world, one morning they left off their patches; they visited the poor and frequented the churches." This pious behaviour led to no material, but only to personal eminence.

Far more than religion, for the ageing women literature, and everything which this implied, was a favourite refuge. To-day, one can hardly form any conception of what literature and 'wit' meant to this period. The salon or *bureau d'esprit* was the great "resource; that occupation *à la mode*, that way of employing one's life invented by the eighteenth century for the maturity of age." Here the heart could find a refuge in intellectual pleasures, in the peace and gentle delights of *belles lettres*. Here the intelligent old lady could play her chiefest role. All Europe listened for the verdicts pronounced in her salon. There minds were attuned to the words of this or that author, poet, or philosopher; here prizes were awarded, and the way was cleared to the Academie. To mention some of these *bureaux d'esprit*: there was, for one, the salon of the serious Madame Lambert. Cards were never seen here. Sometimes, on Wednesdays, after dinner, there were readings from the works of the latest authors, whose success was estimated, and their future discussed. The guests were con-

Old Age

cerned not only with the fate of the books, but also with the careers of their writers. The salon of Madame Lambert was the antechamber of the Academie.

A much smaller salon was that of Madame Denis. Its chief attraction lay in the informal suppers, especially appreciated by certain priests from Gascony. Here was an environment in which Voltaire delighted, when he succeeded in escaping from the salon of Madame de Châtelet.

The salon of Madame Doublet had a more political character. She inhabited a few rooms in a convent, which during the last forty years of her life she never left. Here the news of Paris was bandied to and fro as in a Bourse. But the greatest *bureau d'esprit* of the first half of the eighteenth century was that of old Madame de Tencin. Hers was the secret of the hostess "who listens, and understands, who grasps the main outlines and the fine shades, who feels like a woman and judges like a man." Here all intelligent fold were welcome. The three salons of Madame du Deffand, Madame Geoffrin, and Mademoiselle de Lespinasse, which opened their doors later, was still overshadowed by that of Madame de Tencin.

The career of Madame du Deffand (1698-1780) is of great psychological interest. After a full and varied life—she was the mistress of the Regent, and had many other lovers—in her 68th year she made the acquaintance of an Englishman of letters—Horace Walpole. The acquaintance became a friendship, and to this friendship we owe a famous correspondence. The old lady, as a writer, was by no means inferior to her seventeenth century predecessors, Madame de Sevigné and Madame de Maintenon. "She is, with Voltaire," wrote Sainte-Beuve, "in prose, the purest classic of this epoch, without excepting any of its great writers."

She understood perfectly in her old age, though she suffered the further disability of blindness, how to make herself interesting to herself and others. A blind woman who in the wintry darkness of her old age knew no emotion, no sense of touch, no light, no warmth, save that of the

The Achievements of Women in Old Age

intellect! This woman had always at her disposal, in some sort as the props of her life, the choicest recreation of the age, brilliant society, sparkling conversation, sensational personalities and ideas. Once a week she assembled, at her supper-table, "the greatest names and the greatest ladies." She liked to bring the greatest enemies together, where they could "neither fight nor run away." The book of the day, the new play, the latest pamphlet or treatise was judged in the course of conversation, its leaves turned over, so to speak, with the fingertips of this distinguished company, which was interested in everything. Madame du Deffand constituted the best example of the art of disciplined enjoyment. Pleasure was not left to go its own way, but rather regulated, solicited or inhibited, with the aid of psychological considerations. Contrast and variety were for her the very conditions of life. Situations and impressions must undergo constant change. Life must be unrelaxing. She is the typical example of a human being with an intense thirst for experience, but physically fragile, of whom the need of change and variety is characteristic. Kierkegaard recommended such people to acquire the technique of "spiritual rotation of crops." She knew how to cultivate and develop her talents and aptitudes as the principal source of enjoyment. Her life was centred not upon a cause, a task, an achievement, an idea; all these were only sampled and enjoyed.

The salon of Madame Geoffrin (1699-1777) had a character of its own. Here the Encyclopædists had their rendezvous; it was a centre of culture and a tribunal of good taste. Here watchwords were issued which the rest of Europe, subservient to the French intellect, obeyed. Madame Geoffrin, "a fine figure of a woman," had the art of playing on the intellects of her guests as on an instrument, eliciting from them every note in their compass. A refined egoist, extremely shrewd, it was her constant care to minister to pleasure, and to give it; an occupation which she continued to follow even on her death-bed. Her mind was well

Old Age

provisioned with observations and comparisons, of which, in her own words, she "had a full storehouse for the rest of her days."

Another resort of the Encyclopædists was the salon of Madame Marchais, a woman of phenomenal learning, who could always revive a flagging conversation with the fruits of her reading. Moreover, she was distinguished by a charming courtesy; she was always attentive to all, she conversed with every one, and the just measure, the seemly and appropriate tone of her speech seemed to come quite naturally from her lips, as befitting her personality and the moment.

These classic salons had innumerable offshoots, both in Paris and in the provinces.

Besides these women, who in piety, in the salon, in intrigue, and in the quest of power passed a purposeful old age, there were others who, as they approached the fifties, adapted themselves, in their dress and their mental attitude, unreflectingly to old age.

"The women who prepared to live quietly with old age as with a friend." . . . Such a woman did not need to take up any particular position; she was quite simply content to be an old woman. And of such also the eighteenth century has left us perfect examples. The manner in which a woman encounters age—or rather, the manner in which she goes to meet it—is one of the principal features of that philosophy of life which was useful to her even in marriage. With the passing of time, she adapted herself to age without struggling, with that matchless ease and serenity, with cheerful courage and a jesting heroism, so that neither murmur nor complaint escapes her, neither sigh nor expression of regret. The fair dream of her sex is ended, but she still has the possibility of becoming a lovable human being, and this consolation supports her. To such women the young come for benevolent advice and understanding of all human affairs, for help and forgiveness. Not seldom did those very women who were the loveliest, and gayest and most liberal,

The Achievements of Women in Old Age

whose youth was filled with triumphs and the storms of passion, adapt themselves most successfully to old age, revealing in this new role their special charm. Having taken a farewell of love, they sought friendship. With their worldly experience they combined three qualities of the requisite spiritual attitude: wit, tact, and good taste. In society they represented tradition wedded to tolerance, and dignity without prudishness. They believed in system; they led the fashion; they cherished etiquette and good breeding. Of such a natural, unreflecting way of growing old the Maréchale de Luxembourg was the finest example. She was not *an* old lady, she was *the* old lady of her time; the one who gave the eighteenth century its most graceful manifestation of old age. Her personality was in every respect harmonious with her period. Her youth had been more than frivolous. In old age she was able so perfectly to adapt herself to circumstances, to forget her past so naturally and spontaneously that all those about her joined her in forgetting it.

These women of the eighteenth century, who so well understood the art of growing old, "*qui savoient si bien vieillir*," encountered age in a mood that betrayed far more spiritual fastidiousness and good taste than resignation. They adapted themselves mentally to the new phase of life, and did so with the patience of their placid disposition, renouncing all manner of claims and exigencies, with unclouded serenity, with renunciation and the quietude of maternal forbearance. In their outward person also they adapted themselves to the style of old age, even as they had attuned their souls to the spiritual circumstances of old age. Of all the coquetries of their past as women they kept only *one* in old age: the neatness which was then described as *netteté recherchée*.

By their immaculate exterior, by the care devoted to their dress, the object of daily attention from which nothing deterred them, neither discomfort, nor suffering, nor physical weakness, they avoided, if not the devastations, at least the

Old Age

repulsiveness and unsightliness of old age: they reconciled themselves to the years without suffering any particular hardship, inasmuch as they shook off the dust of time. Every well-bred woman retained this neatness to the last, and there were those who performed their last toilet on their dying bed, as though fearing lest Death might find them unattractive!

Here we take our leave of the women of the eighteenth century, who have shown us how they consciously and rationally gave shape to their old age, of course within the framework and the circumstances of their epoch. The old man ought to find his special style of life. A general style for old age has not yet been found for our period. And yet, with the ever-increasing number of old people in our time, it would seem to be urgently needed. The great stratum of aged people does not know what to do with its surplus years. Yet the discovery of a mature fashion of life is essential to the happiness of life.

THE PERSONAL ATTITUDE TOWARD OLD AGE

“PROFOUNDLY unprepared, we enter upon the evening of life; worse still, we do so under the false assumptions of the truths and ideals in which we have hitherto believed. We cannot live through the evening in accordance with the morning’s programme.” These words of C. G. Jung’s are a fitting preface to the following observations.

True, it is given to many to find their bearings in the second half of life as a matter of course. But for not a few the passage into the higher stage of life is a serious crisis. In the first half of life the man is confronted with tasks connected with his profession, the married state, posterity, and all sorts of ties and relations. From the middle point of life the necessity of adapting himself to the inner self makes itself felt; he must turn toward the inner spiritual realities,

The Personal Attitude toward Old Age

hitherto but little regarded. This seems to be, in the profoundest sense of the word, a preparation for death. For death is no less important than birth, and like this, it belongs inseparably to life (J. Jacobi). Is it to be wondered at that many old people are in need of help? Just as the psychological situation of the individual is different in every phase of life, so must the help of which the man is in need, in his age-conditioned difficulties, be adapted to the circumstances of a given age. In modern psychotherapy this is the line followed by C. G. Jung, who has studied the problem of old age, and whose aim it is to give old age a "significant" form. The Jungian psychology, with its orientation on the spiritual, is conformable with the circumstances of the second half of life, while in the first half, when the most important thing is adaptation to the concrete reality of the outer world and its demands, first and foremost among which, in addition to one's occupation, are marriage and parentage, the Freudian method has its special mission.

The space at our disposal is too restricted to enable us to do more than allude to the difficulties and conflicts of age and the possibilities of overcoming them, of offering help and consolation. We must confine ourselves to a few informal and consciously eclectic hints, which do not, so to speak, go beyond the "lesser" psychotherapy.

Wherever we look around us, in the living world, we see everywhere the constant alternation of becoming and declining, of growth and decay, of youth and age, following one another in eternally changing and therefore eternally uniform procession. And as surely as autumn follows summer, so age follows the periods of youth and maturity. "It is with men as it is with the seasons of the year. Which is the fairest? Each is the fairest to itself, and nothing in the world is less wearisome than the alternation of the series. If one were to experience the circuit of the years a thousand times, it would always be new and lovely, and every year would be lovelier and more fascinating. This wonderful secret of Nature is shared by our own life, which

Old Age

is itself only a part of Nature, so that the seasons of the year are faithfully reflected in the stages of life" (Heinrich Lhotzky). To grow old is therefore to complete a physiological process; we should try to grow old. We all bear our destiny in life within us; it is for us to contribute toward its fulfilment. If we hope for a long life we are hoping for something vouchsafed by Nature. The dread of growing old is mistaken; "Nothing in the world ages one more quickly than the dread of growing old." These words of Ernst von Feuchtersleben are inspired by the profoundest understanding.

Here we may recall a fact of experience in practical life. It concerns the influence of the sixtieth, seventieth, eightieth birthday anniversaries on the persons whose birthdays are being commemorated. The delimitation of these sections of life, which are, of course, artificial, since biological process knows nothing of decades, is often connected, for the persons whose birthdays are celebrated, with certain ideas relating to the coming of old age which have a very unfavourable effect on the vitality. More than one person whose birthdays have thus been celebrated has told me that the jubilee aged him; it was so definitely impressed upon him that he was now a septuagenarian, that since then he had really felt a septuagenarian.

It is impossible to estimate what our culture owes to the ancient Greeks. But in one respect we have no cause to be grateful to them. Their excessive veneration of youthful humanity, in contrast to the Oriental idealization of old age, gave the Occidental conception of life a biased outlook. Our progress in wisdom, experience and humanity with increasing age is connected, in our minds, with physical decay: we are ashamed of our old age, instead of being, like the Chinese, proud of it. We should always like to look younger than we are, and in our Western world, otherwise than in the wise East, it is by no means a compliment if we suggest that a fellow-creature is older than one would judge from his appearance.

The Personal Attitude toward Old Age

The role of the psyche, and this in the Greek sense of the spiritual and intellectual faculties as a whole, can hardly be overestimated in respect of the process of senescence. It is a striking fact that old people who remain intellectually active often wear better physically. Even though the primary connexion is not infrequently reversed, yet a comprehensive causative role must often be allotted to the psyche. Physiological experience attests to a very extensive influence of physical processes by psychic factors. On the other hand, physiological experiments tell us to what a great extent keenness of observation, conception and recollection are effected by disorders and variations of the bodily metabolism. This is as true in age as in any other stage of life. Nowhere is the primacy of the spirit so manifest as in old age.

Every one knows of physically infirm and defective people who are not only spiritually healthy, but who even enrich their private world by their great intellectual animation, their vivacity, their depth of thought and feeling. The same may be said of people in the last phase of life, suffering from all manner of disabilities characteristic of age. The spiritual and intellectual triumph may disregard the physical possibilities. In order to explain more clearly what we mean by this, we will turn once more to Burdach's description of the spiritual life in old age. "But when nothing enduring has been won in earlier life, then, indeed, age lacks its firm foundation, for early intellectual achievement maintains the vitality of old age." So, if the conditions required by Burdach are absent, if only the outer world has been valued, if the cultivation of the mind has been neglected, if no intellectual capital has been amassed, the fair image of old age may easily become a caricature. The spiritual constitution of age stands under the sign of introversion; but introversion can be felicitous only when there is an inner foundation. Otherwise the gradually intruding sense of weakness engenders discontent and envy. If only the outer world is valued, the old man readily forgets his years and exposes

Old Age

himself to ridicule. "But it is when a man is growing old that all the disadvantages of ignorance and idleness make themselves felt. It is the destiny of old age to emphasize all the physical and mental defects, in order to turn the man into a caricature. Nothing can counterbalance this organic decay save intellectual animation. See how the man who has not exercised his mind is bowed down with age!" (C. V. de Bonstetten). The inability to acquire anything further, the desire to retain what has been acquired, degenerates into niggardliness, and the distrust of all things new makes a man unjust. The preference for old things gives rise to prejudice. Instead of clear and ripe judgment we have obstinacy, selfishness, intolerance; old age is only too often disfigured by cantankerousness. S. Hirsch has given an admirable summary of these psychological processes: "Intellectual isolation, which in the cultured man means reserve, harmony, depth, universality, leads, in the absence of intellectual content, to obtuseness, to a sense of emptiness and bitterness, to envy and discontent instead of to resignation. The conservatism of the old man can degenerate into obstinacy, his prudence into avarice. The decline of the faculty of intellectual assimilation may so disconcert him as to result in depression, melancholy, distaste for life, and thoughts of suicide. While on the one hand the spiritual functions in old age must be very essentially dependent on the efficiency of the cortical centres in the brain, within the personality the content of psychic experience, the 'intellectual capital' amassed in youth and middle life, plays the principal part, subject to physiological conditions, in the formation, the degree, and the nature of the so-called psychical phenomena of old age."

In somewhat diffused terms Heinrich Lhotzky says the same thing: "There are people who speak of the wealth of youth and the poverty of age. Such generalizations are certainly erroneous. There is, to be sure, such a thing as poverty-stricken age; but poverty-stricken youth is at least as common. At the same time, there is such a thing as a rich

The Personal Attitude toward Old Age

and superb old age, and the finest thing about it is that the riches of age are acquired, the riches of youth bequeathed and inherited." And we find the same perception in Dostoievski, who in the *Demon* makes Stavrogin say: "One sees yet again that the whole of the second half of human life generally consists of the habits acquired in the first half." This idea, positively elaborated, was expressed by Alfred de Vigny: "What is a great life? A thought of youth realized by ripe age."

For his contemporaries, the man who is entering into old age is, so to speak, completed; a definite personality. To himself, strangely enough, life is only now really beginning; for now comes the test, the verification of the situation assigned to him. The ranks of his older contemporaries, who have hitherto gone before him as a sort of protective screen, are growing thinner. It is a peculiar feeling, the sense of suddenly, so to speak, belonging to the generation which bears the responsibility for the destiny and character of the period in question.

Apart from the intellectual preparation, a prosperous old age requires the spiritual discovery in oneself of a certain adaptability. But the requisite adaptability is one of the qualities which decline in old age, so that here are possibilities of tragic conflicts. The inability to adapt himself to altered circumstances not only upsets the equilibrium of the ageing man; it also affects his family and those about him to a painful extent. Sometimes this inability to adapt himself to the process of growing old assumes absolutely pathological forms, when the pathetic neuroses of the aged may result. We meet with this in people who know, of course, that there is such a thing as old age, and accept it in the case of their contemporaries; but they themselves must remain forever young. They are consequently surprised and overcome by the advent of old age; they see no possibility of making themselves at home in the new phase of life, and it is beyond their power to do so. They find themselves in a psychic situation like that described by

Old Age

Johannes Jensen in *Dr. Renault's Punishment*: "Yes, yes: when one has peacefully acquired experience and understanding, the necessary condition of any æsthetic faculty, then life slams the door in one's face."

The inability to adapt himself to the advent of old age exposes the ageing person to all manner of perils. Erich Stern, to whom we owe a psychological study of the beginning of old age, has pointed to such dangers. Even a man in his thirties knows the value of time; already the thought emerges that hitherto he has squandered many days, many weeks. With this life acquires a quite special rhythm. The man is possessed by an urgent unrest, an impatience; he is in a hurry to "get things done." There are so many things that he would like to do, but the lack of time imposes concentration and renunciation; so he flings himself zealously into certain fragmentary tasks. His powers are strained to the utmost, far beyond their capacity. He may easily reduce himself to a state of overwork and exhaustion. The fear that he may be too late, that he may be missing something, or may lose something, may relate not only to his work, his profession, but also to the pleasures of life. And it is just here that the ageing man is exposed to serious dangers.

When La Rochefoucauld once warned an acquaintance that old age was a wicked tyrant, who forbade the joys of youth under the penalty of death, he received the pertinent answer: "Yes, that may be true of the unreasonable. For the reasonable person age is rather a sensible wife, who without compulsion, and indeed without one's being aware of it, deprives one of the desire for the delights which are no longer befitting." And here we must not forget Voltaire's epigram: "He who has not the spirit of his age has all its misfortune." He who understands how to grow old even perceives the charm of the evanescence of age. He renounces the delights of youth, but he is able, without bargaining, to contrive some sort of comfort for his age. The secret of the good life in old age lies in the possibility of bringing the mode of life and the chronological phase

The Personal Attitude toward Old Age

into harmony, like a well-broken pair of horses, which trot along the highway in perfect agreement, with a safe and deliberate gait.

As regards the physical organism, old age should be mindful of the prosaic medical experience, derived more particularly from the treatment of diseases of the circulatory organs, that its endeavours must be guided by the powers of the organs. "Voluntary restriction represents a greater moral achievement than a misconceived rashness, for experience again and again confirms the fact that no man can give more than he has, or do, in the case of cardiac disorder, more than the circulatory system can perform, without 'running into debt' to that system" (K. Fahrenkamp).

A further danger arises from a false attitude to youth, which may even amount to hatred. The decay of the instinctive life, which many find hard to endure, is often responsible. But with a correct attitude to youth the old man may even come to realize that intercourse with youth can only bring him profit. It is recorded that Kant of deliberate choice frequented only youthful society. In earlier years he had no trust in friendship; in old age he learnt its value, and felt the need of it. And of Lord Rhondda (1856-1918) it is related that he regarded old age as an infectious malady, and as far as possible avoided the society of elderly people; seeking, all the more, the society and comradeship of the young. Such a preference may help to solve the problem of the generations, which in any case the old man should never allow to become acute.

All these dangers the ageing man can encounter with success only if he has retained a certain elasticity, and if he has not allowed himself to become too completely a creature of habit. "Growing old," wrote Goethe, "means to enter upon a new occupation; all one's circumstances are changing and one must either retire from active life, or deliberately and consciously take over the new role." And similar opinions are expressed by the Parisian surgeon

Old Age

Victor Pauchet: "Thus the human autumn is not a gloomy and inclement season, if only one knows how to dispose of it and appreciate its charms. You can then consent to grow old. You must adapt yourself to the new season. Consenting to grow old is not the same as allowing oneself to grow old. To consent to grow old is to accept the inevitable intelligently, while endeavouring to make the best of it. It is to accept the new dwelling-house which is imposed upon you, with the firm intention of keeping it in good order, of diligently repairing any visible dilapidations, of making it comfortable, furnishing it, adorning it, and modernizing it."

Growing old, in the sense of adapting oneself to the altered physical conditions of age, is above all an intellectual function. For us the problem presents itself thus: We hold ourselves in readiness in order to wage a successful war upon advancing age. Here it is possible that the modern neurotherapy can help us. Sir Farquhar Buzzard, the neurologist, gives old people certain advice which has a good deal of truth in it. One does not get the impression, he says, that it is the active and restless spirits whose vital curve is the first to decline. The dread of overworking is very seldom justified. According to the confirmed opinion of the neuro-physiologists, it is easy to exhaust the energy stored in a definite area of the brain, but it is difficult to deplete all the resources of the central nervous system. "In this connexion it is not without profit to recall experiences familiar to all of us: the refreshing, rejuvenating effects of a change in activity. A sense of intolerable fatigue engendered by intense activity in a limited field may be dissipated in a moment by altering the scene of interest." Here, the neurologist suggests, we have "a clue to one of the principles governing the prevention of the pains, penalties and prohibitions of old age." I suggest that a multiplication of interests early in life, the opening up of numerous association-paths in the nervous system, is a measure to be encouraged, and one which may well be calculated to check the advances of senility. Is it not true that among those whom we know as

The Personal Attitude toward Old Age

young for their years the large majority have displayed a wide range of interests and sympathies? "Change as a restorative . . . may be an important factor in deferring infirmity." Sir Farquhar Buzzard suggests that the ideal life—a life that would make for spiritual health—might be compared to a colourful variety programme, including a first-class comedy as *pièce de résistance*.

Carrel also regards changeful and irregular conditions of life, labour, and struggle as of critical importance.

Of course, the avoidance of excesses in drinking and eating is a pre-condition of prosperous old age; but besides this a certain degree of variety is to be recommended: change of habits, change of occupation, change of diet. Sir Farquhar Buzzard recommends those who wish to prolong their life-work to refrain from living too orderly and methodical a life. A little disorder and irregularity does no harm whatever; on the contrary, it helps the intellect to preserve a certain elasticity. Such an opinion does not sound very orthodox. There are to-day so many people whom the developments of modern means of transport fill with horror and misgiving, and who fear that they may result in an increase of nervous disorders. Fortunately it is possible to take another point of view. A reasonable application of modern inventions will offer fresh possibilities of diversity in our physical and intellectual life. Nervous disorders are most frequently observed in persons with restricted interests and a limited sphere of activity. Regular work, regular relaxation, regular sleep and regular meals are the slogans of the mere macrobiotic. We, however, want to prolong not only life, but also achievement. We want to adjourn as long as possible the time when our intellectual field of vision begins to contract, and our opinions become rigid, when our sympathies become restricted and our interests moribund. "To live in the wholesome air and in the sunlight, to eat and drink sensibly, to live morally, to work with muscles, heart and brain—that is the real recipe of the macrobiotic. And not to lose our living interest; for interest

Old Age

is life itself; without interest and without love there is no life." These words of Thomas Masaryk, who began his presidential career at 65, and died in 1937 at the age of 80, may be adduced as further testimony of the same character, and they are based on experience. We find the same truth in Goethe's verses:

" If head's a-whirl, if heart is sore,
What better could you have?
Who loves no longer, errs no more,
His place is in the grave! "

In one way or another, the old man must embrace the world with an impulse of love. Rigidity, aridity, hardness exclude the possibility of love. On the other hand, love may endure in all its splendour and vitality if a certain inner activity and versatility be preserved; therein we have an essential pre-condition of all inner growth and further development. "In its profoundest essence," says J. G. Carus, "love is really nothing other than a powerful impulse toward the completion of existence, the highest and most blissful completion of our own being."

To such an inner life must refer the words of the French physiologist, Charles Richet (1850-1935), who wrote, at the close of his life: "When quite young I worshipped science, and now, as my days are ending, I still worship this same science. But I understand it in a more comprehensive manner than when I began. The science of life merges in the science of thought, and I foresee magnificent horizons in the future." Similar opinions have been expressed by the philosopher and publicist Edgar Quinet: "I looked forward to old age as to a frozen peak, restricted, whelmed in fog. On the contrary, I beheld all around me a vast horizon which had never revealed itself to my eyes." And the aged Chief Justice of Ontario, Sir William Mulock (1844-1944), replied to those who congratulated him on his 86th birthday: "I am still at work, with my hand to the plough, and my face to the future. The shadows of evening lengthen about me, but morning is in my heart. . . . I have had

The Personal Attitude toward Old Age

varied fields of labour and full contact with men and things, and have warmed both hands before the fire of life. The testimony I bear is this: that the castle of enchantment is not yet behind me, it is before me still and daily I catch glimpses of its battlements and towers. The rich spoils of memory are mine. Mine, too, are the precious things of to-day—books, flowers, pictures, nature and sport. . . . The best of life is always farther on. Its real lure is hidden from our eyes somewhere beyond the Hills of Time."

Pope Leo XII appears to have regarded life in much the same way. It is related that when he was entering his goth year a lady said to him that he would surely live to see his 100th birthday; to which the venerable prince of the Church replied: "Why set a limit to the Divine kindness?" Or, as the painter Corot said, when he was 77 years of age: "If Providence gives me another two years I believe I shall still be able to paint something beautiful." Leopold von Ranke began to dictate his history of the world at the age of 83. "God," he considered, "can take no pleasure in a torso"; so that he had hopes of finishing the work.

Only a special attitude of mind can successfully overcome the tragedy of old age. Schopenhauer writes: "If the character of the first half of life is an unsatisfied longing for happiness, that of the second half is an apprehension of unhappiness." Somewhere, in the second phase of life, the anxious question is asked in the inmost mind: "Where are we going?" From immemorial ages men have sought an answer to the question. Mystics and philosophers have guided the old along the most diverse paths of wisdom; religion offers help and consolation in its gospel of salvation. The religious man sees in life a gift, the most glorious of gifts. Life is presented to us. Let us accept it gratefully, in all its fullness. Let us rejoice if long life is vouchsafed to us. If we receive life as a gift and feel it to be a gift, we may be confident of solace from the giver of this gift; for in the words of the Divine Consolation (Isaiah xlv. 4): "And even to your old age I am he; and even to hoar hairs will I carry you."

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